JUNE 1978 Number 406 - Part I

JUL 24 1978

Solar-Geophysical Data prompt reports

Data for May -- April 1978
Explanation of Data Reports Issued as Number 402 (Supplement) February 1978

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57
406
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NEW DATA PAGE 44
ERRATA PAGES 28, 46, 158

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / BOULDER, COLORADO

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Solar - Geophysical Data

NO. 406 JUNE 1978

Part I (Prompt Reports)

DATA FOR
MAY 1978
APRIL 1978

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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To standardize referencing these reports in the open literature, the following format is recommended:

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SOLAR-GEOPHYSICAL DATA

No. 406

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar-Terrestrial Data Services Division

CONTENTS

PAGE

Part I (Prompt Reports)

Index for 1977 and 1978 2

Data for May 1978 3-50

Data for April 1978 51-172

Part II (Comprehensive Reports)

Index for 1977 and 1978 2

Data for December 1977 3-47

Data for November 1977 49-59

Miscellaneous Data 61-84

Solar Radio Waves
Selected Events by Radioheliograph, March 1978
Spectral Observations Culgoora, March 1978,
" " Manila, January 1978

Geomagnetic Indices
Sudden Commencements and Solar Flare Effects,
March 1978

Cosmic Rays
Neutron Monitor Daily Values and Chart of Variations
Climax, December 1977 - March 1978

Energetic Solar Particles
GMS/SEM Data for September 1977 Event

INDEX FOR 1977 AND 1978 DATA PUBLISHED IN "SOLAR-GEOPHYSICAL DATA"

		1977 Aug	Sep	Oct	Nov	Dec	1978 Jan	Feb	Mar	Apr	May
A.	SOLAR AND INTERPLANETARY PHENOMENA										
A.1	Sunspot Drawings	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.2a	Zurich Provisional Relative Sunspot Numbers Rz	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.2b	Zurich Final Sunspot Numbers Rz	404A 7	404A 8	404A 8	404A 8	404A 8					
A.2c	American Relative Sunspot Numbers RA'	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.3a	Mt. Wilson Magnetograms	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.3b	Mt. Wilson Magnetic Characteristics of Sunspots	398A 98	399A 94	400A 92	401A 96	402A100	403A108	404A 96	405A110	406A114	
A.3c	Kitt Peak Magnetograms	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.3d	Mean Solar Magnetic Field (Stanford)	397A 25	398A 29	399A 29	400A 24	401A 31	402A 33	404A 33	404A 33	405A 36	406A 40
A.4	H-alpha Filtergrams	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.5	Calcium Plage Drawings - McMath (or Catania)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.5a	Calcium Plage (McMath) and Sunspot Regions	398A 98	399A 94	400A 92	401A 96	402A100	403A108	404A 96	405A110	406A114	
A.5b	McMath Daily Calcium Plage Indices	398A105	399A 99	400A 99	401A100	402A105	403A114	404A104	405A119	406A124	
A.6	H-alpha Synoptic Charts	398A 34	399A 32	400A 28	401A 35	402A 36	403A 44	404A 38	405A 46	406A 52	
A.6b	Synoptic Chart and Active Regions (Paris)	402B 4	403B 4	404B 4	405B 4	406B 4					
A.7f	Helium 03 Chromosphere (Big Bear)	397A 19	398A 24	399A 24	400A 21	401A 28	402A 29	403A 36	404A 29	405A 31	406A 35
A.7g	Helium Synoptic Maps (KPNO)	397A 20	398A 22	399A 23	400A 20	401A 27	402A 28	403A 35	404A 27	405A 32	406A 36
A.7h	Coronal Line Emission (Sac Peak)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.8aa	2800 MHz - Daily Values of Solar Flux (ARO-Ottawa)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.8ac	2800 MHz - Daily Values of Adj. Solar Flux (ARO-Ottawa)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.8g	Daily Values of Adjusted Solar Flux (AFGL)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.9cb	8.6 mm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 57	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.9d	2 cm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 52	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.10a	169 MHz - Interferometric Observations (Nancay)	397A 13	398A 14	399A 14	400A 12	401A 15	402A 16	403A 20	404A 17	405A 17	406A 19
A.10c	21 cm East-West Solar Scans (Fleurs)	397A 15	398A 16	399A 16	400A 14	401A 17	402A 19	403A 23	404A 20	405A 20	406A 22
A.10d	43 cm East-West Solar Scans (Fleurs)	397A 16	398A 17	399A 17	400A 15	401A 18	402A 20	403A 24	404A 21	405A 21	406A 23
A.10e	10.7 cm East-West Solar Scans (Ottawa-ARO)	397A 14	398A 15	399A 15	400A 13	401A 16	402A 18	403A 22	404A 19	405A 19	406A 21
A.10f	3 cm East-West Solar Scans (Toyokawa)					403B 68	402A 17	403A 21	404A 18	405A 18	406A 20
A.11k	Solar X-ray Radiation (SOLRAD 11)						403A116	404A108	405A122	406A129	
A.11g	Solar X-ray (SMS/GOES)	---	398A 25	399A 20	400A 17	401A 22	402A 24	403A 29	404A 24	405A 29	406A 30
A.11h	Solar X-ray (OSO-8; 1975-057A)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.11i	Solar X-ray (Columbia U.)	404B 65	404B 68	404B 40							
A.12ba	Cosmic Ray Protons (Pioneers 6 & 7)	397A 23	---	399A 26	---	---	402A 30	---	---	---	---
A.12bb	Cosmic Ray Protons (Pioneers 8 & 9)	---	---	399A 27	---	---	402A 31	---	---	---	---
A.12e	Energetic Solar Particles (IMP H & J)	402B 24	403B 37	404B 35	405B 22	406B 43					
A.12f	Energetic Solar Particles (GMS/SEM)	---	406B 78	---	---	---	---	---	---	---	406A 44
A.13a	Solar Wind (Pioneers 6 & 7)	397A 23	---	399A 26	---	---	402A 30	---	---	---	---
A.13ab	Solar Wind (Pioneers 8 & 9)	---	---	399A 27	---	---	402A 31	---	---	---	---
A.13d	Solar Wind from IPS Measurements	397A 27	398A 27	399A 25	400A 25	401A 29	402A 34	403A 37	404A 31	405A 37	406A 41
A.13e	Solar Plasma (IMP H & J)	402B 23	403B 22	404B 34							
A.17	Interplanetary Magnetic Field (Pioneer 8)	---	---	---	---	---	---	---	---	---	---
A.17	Interplanetary Magnetic Field (Pioneer 9)	---	---	---	---	---	402A 31	---	---	---	---
A.17c	Inferred IP Magnetic Field	397A 24	398A 28	400A 22	400A 22	401A 30	402A 32	403A 38	404A 32	406A 38	406A 38
A.18	Interplanetary Electric Field (Pioneer 8)	---	---	399A 27	---	---	---	---	---	---	---
A.18	Interplanetary Electric Field (Pioneer 9)	---	---	---	---	---	402A 31	---	---	---	---
B.	IONOSPHERIC (AND RADIO WAVE PROPAGATION) PHENOMENA										
B.52	Graphs of Transmission Frequency Range	398A124	399A128	400A120	401A116	402A132	403A148	404A144	405A158	406A171	
B.53	Quality Figures Based on Frequency Ranges	398A126	399A127	400A122	401A118	402A131	403A150	404A146	405A157	406A170	
C.	FLARE-ASSOCIATED EVENTS										
C.1a	Optical Observations Flares	397A 10	398A 10	399A 10	400A 10	401A 10	402A 12	403A 12	404A 12	405A 12	406A 12
C.1ba	Optical Observations Flares (Standardized Data)	402B 8	403B 8	404B 8	405B 8	406B 8					
C.1d	Flare Patrol Observations	397A 12	398A 13	399A 13	400A 11	401A 14	402A 15	403A 19	404A 16	405A 16	406A 18
C.1d	Flare Patrol Observations	402B 17	403B 21	404B 22	405B 16	406B 25					
C.1e	Flare Indices (by day)	402B 16	403B 20	404B 21	405B 15	406B 24					
C.1f	Flare Indices (by Region)	403B 53	404B 53	405B 38	406B 59						
C.3	Solar Radio Waves - Outstanding Occurrences	402B 18	403B 22	404B 23	405B 17	406B 26					
	Solar Radio Waves - Fixed Frequencies - Selected	397A 17	398A 18	399A 18	400A 16	401A 19	402A 21	403A 25	404A 22	405A 22	406A 24
C.3t	43.25, 80 and 160 MHz Selected Bursts (Culgoora)	399B 36	399A113	401B 44	403B 64	403B 65	405B 45	405B 48	406B 62		
C.4a	Solar Radio Spectral Obs. (Fort Davis)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4d	Solar Radio Spectral Obs. (Culgoora)	400B 62	399A102	401B 38	403B 56	403B 59	404B 56	405B 40	406B 64		
C.4e	Solar Radio Spectral Obs. (Weissenau)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4f	Solar Radio Spectral Obs. (Sagamore Hill)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4h	Solar Radio Spectral Obs. (Dwingeloo)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	---	
C.4i	Solar Radio Spectral Obs. (Durnten)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4j	Solar Radio Spectral Obs. (Manila)		399A102	400A101	401A102	402A108	406B 70	404A122	405A138	406A144	
C.5e	Solar X-ray (SMS/GOES)	397A 22	399B 37	399A 22	400A 19	401A 24	402A 26	403A 29	404A 26	---	406A 32
C.5f	Solar X-ray (Columbia U.)										
C.6	Sudden Ionospheric Disturbances	398A106	399A100	400A100	401A101	402A106	403A115	404A105	405A120	406A125	
D.	GEOMAGNETIC AND MAGNETOSPHERIC PHENOMENA										
D.1a	Geomagnetic Indices Kp, Kn, Ks, Km, Ap, aa, Cp	398A117	399A120	400A113	401A109	402A125	403A142	404A139	405A151	406A162	
D.1ba	27-day Chart of Kp Indices	398A119	399A122	400A115	401A111	402A127	403A144	404A141	405A153	406A164	
D.1c	27-day Chart of C9	404A142	404A142	404A142	404A142	404A142					
D.1d	Principal Magnetic Storms	398A122	399A125	400A118	401A114	402A130	403A145	404A143	405A156	406A167	
D.1e	Reduced Magnetograms								405A 39		
D.1f	Sudden Commencement and Solar Flare Effects	398A123	399A126	400A119	401A115	403B 69	403A147	405B 55	406B 72	406A169	
D.1g	Equatorial Indices Dst	398A121	399A124	400A117	401A113	402A129	405B 53	405B 54	405A155	406A166	
F.	COSMIC RAYS										
F.1a	Cosmic Ray Neutron Counts (Deep River)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150		
F.1b	Cosmic Ray Neutron Counts (Climax)	398A116	399A115	400A112	401A108	406B 73	406B 73	406B 73	406B 73	406A161	
F.1e	Cosmic Ray Neutron Counts (Alert)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150		
F.1f	Cosmic Ray Neutron Counts (Calgary)	400B 70	400B 70	402B 47							
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	400B 70	---	402B 47							
F.1h	Cosmic Ray Neutron Counts (Thule)										
F.1i	Cosmic Ray Neutron Counts (Kiel)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	
F.1k	Cosmic Ray Neutron Counts (Kula)	398A116									
H.	MISCELLANEOUS										
H.60	IUWDS Alert Decisions	397A 4	398A 4	399A 4	400A 4	401A 4	402A 5	403A 5	404A 4	405A 4	406A 4
H.62	Abbreviated Calendar Record	403B 46	404B 46	405B 30	406B 52						

Notes:

"398A 36" listed under 1977 Aug means that data for August 1977 were contained in *Solar-Geophysical Data* Number 398 - Part I, beginning on page 36.

A = Part I, B = Part II.

----- = no data available.
blank = data not yet received.

MAY 1978 DATA

Contents

	Page
Alert Period	
IUWDS Alert Periods (Advance and Worldwide)	4-7
Daily Solar Indices	
12-Month Tables Sunspot Numbers, R_z, and 2800 MHz Flux Adjusted to 1 A.U.	8
Combined Table Sunspot Numbers and Solar Fluxes	9
Graph of Sunspot Cycles	10
Zürich Smoothed Observed and Predicted Sunspot Numbers	11
Solar Flares	
Hα Solar Flares	12-17
No-Flare-Patrol Chart	18
Solar Radio Waves	
169 MHz Solar Interferometric Chart - Nancay	19
3 cm East-West Solar Scans - Toyokawa	20
10.7 cm East-West Solar Scans - ARO, Ottawa	21
21 cm East-West Solar Scans - Fleurs	22
43 cm East-West Solar Scans - Fleurs	23
Selected Fixed-Frequency Occurrences	24-28
Selected Solar Noise Burst	29
Solar X-ray Radiation	
SMS-2 GOES	30-34
Coronal Holes	
Helium D3 Chromosphere	35
Helium 10830 Å Synoptic Map	36-37
Inferred IP Magnetic Field Polarities	38
Mean Solar Magnetic Field	
Stanford Mean Solar Magnetic Field Map	39
Stanford Mean Solar Magnetic Field Table	40
Solar Wind Measurements	
Scintillation Observations	41
Geomagnetic	
Substorms	42
Magnetograms of Geomagnetic Storm 30 April - 4 May	43
Energetic Solar Particles	
GMS/SEM, 7 May 1978 Event with GOES-1 X-ray event and Alaskan Chain Stacked Magnetograms	44-50

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

MAY 1978

PRESTO MESSAGES (the RAPID report of major events).

BOULDER 01/1937Z SOFLARE M7/3B N22W10 01/1914Z DURATION 79 MINUTES. TENFLARE 2086 FLUX UNITS 01/1917Z IN PROGRESS AT 01/2100Z.
BOULDER 02/0100Z STRONG MAGSTORM IN PROGRESS BEGAN 01/1940Z.
BOULDER 07/0130Z TENFLARE 170 FLUX UNITS 06/2013Z DURATION 21 MINUTES.
BOULDER 07/0430Z SOFLARE X2/BSL N20W90 07/0320Z DURATION 24 MINUTES. TENFLARE 900 FLUX UNITS 07/0321Z IN PROGRESS.
BOULDER 07/2145Z POLCAP ABSORPTION BEGAN AT 07/0515Z MAXIMUM 2.2DB ABSORPTION AT 07/0649Z. ENDED AT 07/0830Z.
BOULDER 20/0040Z SOFLARE M1/2B S20W67 19/2258Z DURATION 37 MINUTES.
BOULDER 28/1630Z SOFLARE X1 N16W10 28/1457Z DURATION 12 MINUTES.
BOULDER 29/1843Z TENFLARE 250 FLUX UNITS 29/1757Z DURATION 6 MINUTES.
BOULDER 30/1532Z SOFLARE M5/2B N17W29 30/0716Z DURATION 10 MINUTES.
BOULDER 31/1328Z SOFLARE M5/2B N23W50 31/1009Z DURATION 140 MINUTES. THREE PARALLEL RIBBONS WITH UMBRAL COVERAGE.

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
121	1	30	162	185	30	N30W61	0	0	0	SOFLARE X2/2B N20	30	N30W61	Q	PROTON FLARE ALERT 01/XX MAGALERT
						N28W51	0	0	0	E11 30/1439Z DURA-		N28W51	Q	01/XX
						N21E06	9	3	1	TION 41 MIN. TEN-		N21E06	P	
						N23E25	1	0	0	FLARE 2900 F.U. 30/		N23E25	Q	
										1437Z DURATION 143				
										MIN. PCA BEGAN				
										29/1030Z MAX 9.8 dB				
										AT 30/1745Z IN PROG-				
										RESS SSC 30/0952Z.				
122	2	1	215	179	50	N22W10	2	1	0	SOFLARE M7/3B	1	N22W10	P	PROTON FLARE ALERT 02/XX MAGALERT
						N27W70	0	0	0	01/1914Z DURATION		N27W70	Q	02/XX
						N23E12	1	0	0	79 MIN. TENFLARE		N23E12	Q	
						S27W73	4	0	0	2086 F.U. 01/1917Z		S27W73	E	
						S26E73	0	0	0	DURATION 128 MIN.		S26E73	Q	
						N31W26	0	0	0	STRONG MAGSTORM		N31W26	Q	
						S22E41	0	0	0	BEGAN 01/1840Z IN		S22E41	Q	
										PROGRESS. PCA IN				
										PROGRESS 2.2 dB				
										ABSORPTION.				
123	3	2	247	180	55	N21W23	5	0	0		2	N21W23	E	SOLALERT 03/XX MAGALERT 03/06
						N23W05	3	0	0			N23W05	E	
						S29W87	3	0	0			S29W87	E	
						S26E62	1	0	0			S26E62	Q	
						N31W43	0	0	0			N31W43	Q	
						S23E23	0	0	0			S23E23	Q	
						N17E65	1	0	0			N17E65	Q	
						N22E18	0	0	0			N22E18	Q	
124	4	3	142	179	33	N20W36	8	0	0		3	N20W36	E	SOLALERT 04/06 MAGALERT 04/05
						N23W15	3	0	0			N23W15	E	
						S26E51	0	0	0			S26E51	Q	
						N14E48	3	0	0			N14E48	E	
125	5	4	106	175	50	N21W51	9	2	0		4	N21W51	P	MAJOR FLARE ALERT 05/07 MAGALERT
						N22W29	5	1	0			N22W29	E	05/06
						S27E39	0	0	0			S27E39	Q	
						N18E37	2	0	0			N18E37	Q	
						N16W43	0	0	0			N16W43	Q	
126	6	5	179	172	08	N21W63	10	0	0		5	N21W63	P	PROTON FLARE ALERT 06/08 MAGNIL
						N22W45	2	0	0			N22W45	E	
						S27E27	0	0	0			S27E27	Q	
						N18E23	1	0	0			N18E23	Q	
						N23W30	0	0	0			N23W30	Q	
						N15W57	0	0	0			N15W57	Q	
						N18E72	0	0	0			N18E72	Q	
127	7	6	167	170	03	N20W76	8	0	0	TENFLARE 07/0130Z	6	N20W76	P	PROTON FLARE ALERT 07/08 MAGQUIET
						N21W59	7	0	0	170 F.U. 06/2013Z		N21W59	A	
						S27E14	1	0	0	DURATION 21 MIN.		S27E14	E	
						N18E10	0	0	0			N18E10	Q	
						N19E66	0	0	0			N19E66	A	
						S19W24	0	0	0			S19W24	Q	
						N17E33	0	0	0			N17E33	Q	
128	8	7	114	165	07	N23W87	5	0	0	TENFLARE X1 N22W64	7	N23W87	A	SOLALERT 08/10 MAGALERT 09/10
						N21W70	9	1	1	07/0320Z DURATION		N21W70	C.P.	
						S25W01	0	0	0	24 MIN. PCA BEGAN		S25W01	Q	
						N17W01	0	0	0	07/0515Z MAX 2.2 dB		N17W01	Q	
						N17E48	1	0	0	AT 07/0649Z ENDED		N17E48	Q	
						N17E59	1	0	0	07/0830Z. PROTON		N17E59	Q	
										EVENT BEGAN AT 07/				
										0430Z MAX OF ABOUT				
										100 PROTONS/cm²/sec/				
										ster GREATER THAN 10				
										MEV AT 07/0530Z.				
										ENDED AT 07/1660Z.				
129	9	8	120	141	12	N21W83	4	2	0	SUDDEN COMMENCEMENT	8	N21W83	C.P.	SOLALERT 09/10 MAGALERT 09/10
						S27W12	1	0	0	08/2345Z		S27W12	Q	
						N18W15	1	0	0			N18W15	Q	
						N18E35	1	0	0			N18E35	Q	
						N18E51	3	0	0			N18E51	Q	
						N19E68	0	0	0			N19E68	Q	
						S17E69	0	0	0			S17E69	Q	
130	10	9	106	133	49	S26W25	0	0	0		9	S26W25	Q	SOLALERT 10/10 MAGALERT 10/12
						N17W30	0	0	0			N17W30	Q	
						N18E25	0	0	0			N18E25	Q	
						N18E33	1	0	0			N18E33	Q	
						N19E55	0	0	0			N19E55	Q	
						S18E62	1	0	0			S18E62	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

MAY 1978

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
131	11	10	092	127	05	S26W37	0	0	0		10	S26W37	Q	SOLNIL MAGALERT MINOR 11/11
						N17W43	0	0	0			N17W43	Q	
						N17E10	0	0	0			N17E10	Q	
						N17E20	0	0	0			N17E20	Q	
						N19E41	0	0	0			N19E41	Q	
						S18E50	0	0	0			S18E50	Q	
						S32E40	0	0	0			S32E40	Q	
132	12	11	103	131	20	S27W49	0	0	0		11	S27W49	Q	SOLQUIET MAGNIL
						N18W57	0	0	0			N18W57	Q	
						N17W03	1	0	0			N17W03	Q	
						N17E09	1	0	0			N17E09	Q	
						S19E37	0	0	0			S19E37	Q	
						S32E27	0	0	0			S32E27	Q	
133	13	12	131	135	17	S28W62	0	0	0		12	S28W62	Q	SOLQUIET MAGQUIET
						N17W70	0	0	0			N17W70	Q	
						N15W17	0	0	0			N15W17	Q	
						N17W06	0	0	0			N17W06	Q	
						S20E24	0	0	0			S20E24	Q	
						S32E14	0	0	0			S32E14	Q	
						N22E64	0	0	0			N22E64	Q	
						S26W82	0	0	0			S26W82	Q	
						S26E82	0	0	0			S26E82	Q	
134	14	13	156	137	08	N17W82	0	0	0		13	N17W82	Q	SOLQUIET MAGQUIET
						N17W29	0	0	0			N17W29	Q	
						N17W18	1	0	0			N17W18	Q	
						S20E10	1	0	0			S20E10	E	
						S37E02	0	0	0			S37E02	Q	
						N23E51	4	0	0			N23E51	E	
						S25W68	0	0	0			S25W68	Q	
						N15E73	0	0	0			N15E73	Q	
						S15W44	0	0	0			S15W44	Q	
						S26W30	1	0	0			S26W30	Q	
135	15	14	150	141	11	N18W31	0	0	0		14	N18W31	Q	SOLQUIET MAGQUIET
						S20W02	2	0	0			S20W02	E	
						N21E38	4	0	0			N21E38	Q	
						S28E56	1	0	0			S28E56	Q	
						N14E61	1	0	0			N14E61	Q	
						S14W63	0	0	0			S14W63	Q	
						S26W46	1	0	0			S26W46	Q	
136	16	15	146	143	05	N18W45	0	0	0		15	N18W45	Q	SOLQUIET MAGQUIET
						S21W16	0	0	0			S21W16	Q	
						N21E24	2	0	0			N21E24	Q	
						S26E45	1	0	0			S26E45	Q	
						N13E48	0	0	0			N13E48	Q	
						S14W76	0	0	0			S14W76	Q	
						S26W61	0	0	0			S26W61	Q	
						N20E48	0	0	0			N20E48	Q	
137	17	16	195	149	05	N17W58	2	0	0		16	N17W58	E	SOLQUIET MAGQUIET
						S21W28	5	0	0			S21W28	E	
						N21E09	3	0	0			N21E09	E	
						S26E31	0	0	0			S26E31	Q	
						N13E34	0	0	0			N13E34	Q	
						S14W87	0	0	0			S14W87	Q	
						S26W74	0	0	0			S26W74	Q	
						N20E39	0	0	0			N20E39	Q	
						N15W04	0	0	0			N15W04	Q	
						S18E56	0	0	0			S18E56	Q	
						N21E46	0	0	0			N21E46	Q	
						N18E35	0	0	0			N18E35	Q	
138	18	17	156	141	08	N18W72	1	0	0		17	N18W72	Q	SOLQUIET MAGQUIET
						S21W41	1	0	0			S21W41	E	
						N21W01	1	0	0			N21W01	E	
						S27E15	2	0	0			S27E15	E	
						N12E23	0	0	0			N12E23	Q	
						S29W91	3	0	0			S29W91	Q	
						S28E24	1	0	0			S28E24	Q	
						S31E74	0	0	0			S31E74	Q	
139	19	18	121	132	05	N18W86	0	0	0		18	N18W86	Q	SOLQUIET MAGALERT 20/21
						S22W53	0	0	0			S22W53	Q	
						N21W14	0	0	0			N21W14	E	
						S26E00	0	0	0			S26E00	E	
						N12E08	0	0	0			N12E08	Q	
						S27E16	0	0	0			S27E16	Q	
						S29E62	0	0	0			S29E62	Q	
						N18W66	0	0	0			N18W66	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

MAY 1978

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
140	20	19	155	131	04	S21W66	6	1	0	SOFLARE M1/2B	19	S21W66	C.A.	SOLQUIET MAGALERT 20/22
						N21W25	0	0	0	S20W67 19/2258Z		N21W25	E	
						S26W10	0	0	0	DURATION 37 MIN.		S26W10	E	
						N12W03	0	0	0			N12W03	Q	
						N23E09	1	0	0			N23E09	E	
						N17E15	0	0	0			N17E15	Q	
						S27W00	0	0	0			S27W00	E	
						S29E48	0	0	0			S29E48	Q	
						N17W80	0	0	0			N17W80	Q	
						N17W17	0	0	0			N17W17	Q	
141	21	20	148	130	04	S21W79	7	0	0		20	S21W79	C.A.	SOLQUIET MAGALERT 21/23
						N20W39	0	0	0			N20W39	E	
						S27W24	0	0	0			S27W24	Q	
						N12W17	0	0	0			N12W17	Q	
						N23W04	0	0	0			N23W04	Q	
						S28W13	0	0	0			S28W13	Q	
						S30E34	0	0	0			S30E34	Q	
						S17E61	0	0	0			S17E61	Q	
						S32E24	0	0	0			S32E24	Q	
142	22	21	140	130	12	N21W92	3	0	0	TENFLARE 100 F.U.	21	N21W92	Q	SOLQUIET MAGALERT 22/23
						N20W53	0	0	0	21/0537Z DURATION		N20W53	C.A.	
						S27W37	0	0	0	8 MIN. TOYOKAWA.		S27W37	C.A.	
						N12W31	0	0	0			N12W31	Q	
						N22W18	0	0	0			N22W18	Q	
						S30W22	0	0	0			S30W22	Q	
						S29E22	0	0	0			S29E22	Q	
						S17E49	0	0	0			S17E49	Q	
						N32W11	0	0	0			N32W11	Q	
						N18E71	6	0	0			N18E71	C.A.	
143	23	22	105	135	22	S27W52	4	0	0		22	S27W52	E	SOLQUIET MAGALERT MINOR 23/23
						N12W43	0	0	0			N12W43	Q	
						S29E10	0	0	0			S29E10	Q	
						S17E36	0	0	0			S17E36	Q	
						N18E61	2	0	0			N18E61	E	
						N18E81	1	0	0			N18E81	Q	
						N26E85	0	0	0			N26E85	Q	
144	24	23	111	141	14	S26W66	0	0	0		23	S26W66	Q	SOLQUIET MAGNIL
						N12W55	0	0	0			N12W55	Q	
						S29W02	0	0	0			S29W02	Q	
						N17W68	0	0	0			N17W68	Q	
						S17E17	0	0	0			S17E17	Q	
						N17E59	2	1	0			N17E59	E	
						N26E70	1	1	0			N26E70	E	
145	25	24	115	145	23	S26W80	1	0	0		24	S26W80	Q	SOLQUIET MAGQUIET
						N17W70	0	0	0			N17W70	Q	
						S30W15	1	0	0			S30W15	E	
						S17E07	0	0	0			S17E07	Q	
						N17E39	4	1	0			N17E39	E	
						N25E56	0	0	0			N25E56	Q	
						S16E20	0	0	0			S16E20	Q	
146	26	25	178	144	14	N11W82	0	0	0		25	N11W82	Q	SOLQUIET MAGQUIET
						S29W25	0	0	0			S29W25	Q	
						N18E27	5	0	0			N18E27	E	
						N26E43	1	0	0			N26E43	Q	
						S16W31	0	0	0			S16W31	Q	
						N24E16	0	0	0			N24E16	Q	
						N18E67	0	0	0			N18E67	Q	
						N22E72	0	0	0			N22E72	Q	
147	27	26	169	146	10	S29W40	1	0	0		26	S29W40	E	SOLALERT MAGQUIET
						N18E14	2	1	0			N18E14	A	
						N26E30	0	0	0			N26E30	Q	
						N22E02	1	0	0			N22E02	E	
						N18E54	3	1	0			N18E54	A	
						N21E60	0	0	0			N21E60	Q	
						S16E15	0	0	0			S16E15	Q	
						S23E68	0	0	0			S23E68	Q	
148	28	27	170	148	05	S30W52	0	0	0		27	S30W52	Q	SOLALERT MAGALERT 28/30
						N18E01	2	0	0			N18E01	A	
						N26E16	0	0	0			N26E16	E	
						N23W10	1	0	0			N23W10	E	
						N20E42	2	0	0			N20E42	A	
						N23E46	1	0	0			N23E46	Q	
						S17E02	0	0	0			S17E02	Q	
						S25E58	0	0	0			S25E58	Q	
149	29	28	141	145	05	N17W12	5	0	1	SOFLARE X1 N16W10	28	N17W12	D.P.	SOLALERT 29/XX MAGALERT 29/30
						N27E04	0	0	0	28/1457Z. DURATION		N27E04	Q	
						N23W23	1	1	0	12 MIN.		N23W23	C.A.	
						N20E29	0	0	0			N20E29	E	
						N25E34	0	0	0			N25E34	Q	
						S16W09	0	0	0			S16W09	Q	
						S24E46	0	0	0			S24E46	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

MAY 1978

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location Lat-Long	No. of Flares Total	M	X		Date	Location Lat-Long	Desc*	
150	30	29	167	145	09	N17W25	2	1	0	TENFLARE 250 F.U.	29	N17W25	E	SOLALERT 30/31 MAGALERT 30/30
						N26W10	0	0	0	29/1757Z DURATION		N26W10	Q	
						N22W36	1	0	0	6 MIN.		N22W36	Q	
						N19E14	2	0	0			N19E14	Q	
						N23E19	1	0	0			N23E19	Q	
						S17W23	1	0	0			S17W23	Q	
						S22E32	0	0	0			S22E32	Q	
						S23W60	0	0	0			S23W60	Q	
151	31	30	258	146	17	N18W35	6	2	0	SOFLARE M5/2B	30	N18W35	A	SOLALERT PIANO 31/01
						N26W21	0	0	0	N17W29 30/0716Z		N26W21	Q	MAGALERT MINOR 30
						N23W50	2	0	0	DURATION 10 MIN.		N23W50	Q	
						N21E05	4	0	*0			N21E05	E	
						S15W37	2	0	0			S15W37	Q	
						S23E18	0	0	0			S23E18	Q	
						S22W72	1	0	0			S22W72	Q	
						S15W16	0	0	0			S15W16	Q	
						S18W08	0	0	0			S18W08	Q	
						N35W44	1	0	0			N35W44	Q	
						N19W19	0	0	0			N19W19	Q	
152	01	31	232	148	16	N18W53	2	1	0	SOFLARE M5/2B	31	N18W53	A	SOLALERT PIANO 01 MAGNIL
						N25W34	0	0	0	N23W50 31/1009Z		N25W34	Q	
						N23W63	2	0	0	DURATION 140 MIN.		N23W63	Q	
						N21W08	1	0	0	THREE PARALLEL		N21W08	Q	
						S15W53	0	0	0	RIBBONS WITH		S15W53	Q	
						S24E03	0	0	0	UMBRAL COVERAGE.		S24E03	Q	
						S22W84	0	0	0			S22W84	Q	
						S17W33	2	0	0			S17W33	Q	
						S19W19	0	0	0			S19W19	Q	
						N35W58	0	0	0			N35W58	Q	
						S27E18	0	0	0			S27E18	Q	

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_z

	1977 FINAL							1978 PROVISIONAL				
DAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
1	44	42	17	22	43	44	20	84	126	93	70	77
2	43	45	15	29	37	48	20	88	120	83	68	85
3	43	42	24	29	47	25	31	102	131	95	71	91
4	49	39	19	25	47	22	47	102	138	103	75	76
5	48	48	23	28	48	25	58	73	137	76	94	74
6	39	48	26	26	55	27	58	69	129	67	92	73
7	41	25	28	25	57	34	55	42	121	90	88	70
8	38	20	25	18	52	27	45	36	89	99	105	56
9	33	17	30	30	47	31	58	36	94	85	126	59
10	29	23	25	40	38	25	75	15	96	92	111	57
11	27	9	23	45	28	26	71	18	95	85	109	63
12	22	8	29	51	33	27	62	26	92	78	107	65
13	20	10	40	48	53	28	44	26	93	65	93	72
14	25	7	48	47	48	31	37	36	82	62	75	72
15	8	0	42	53	54	39	41	30	59	72	61	78
16	8	0	38	56	53	49	39	23	64	70	85	91
17	8	0	36	53	51	51	29	24	56	66	99	79
18	21	0	40	60	50	54	33	14	55	72	100	85
19	33	7	35	59	54	52	40	8	53	64	107	84
20	21	5	33	60	54	38	23	7	52	51	115	74
21	28	8	33	58	42	32	23	20	63	77	112	73
22	40	23	38	42	35	28	17	30	74	82	109	73
23	57	38	15	41	30	24	23	43	69	85	105	72
24	60	38	19	48	29	18	31	37	78	82	102	82
25	74	42	25	46	28	18	35	32	94	70	139	86
26	71	42	34	49	38	9	41	47	86	53	115	84
27	74	37	38	54	38	14	50	69	79	56	98	97
28	65	26	36	61	37	9	45	79	88	49	75	90
29	58	16	40	64	42	10	58	98		48	72	103
30	45	10	36	60	45	23	64	104		44	70	107
31		8	31		52		67	118		70		109
MEAN	38.5	21.4	30.1	44.0	43.8	29.1	43.2	49.3	89.8	73.5	94.7	79.3

1977 yearly mean = 27.5

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

	1977							1978				
DAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
1	88.9	102.0	83.0*	83.1	93.8*	94.4	88.4	126.9*	139.1	136.3	130.8	181.4
2	90.9*	100.7	82.6	84.2	93.2	93.6	91.2	133.9	152.6	141.1	129.8	183.0
3	93.0*	97.4	82.3	87.2	97.4	98.4	93.7	130.2	156.6*	145.6	134.5	182.2A
4	94.2	94.0	82.9*	84.2	98.8	89.4	95.9	124.8	154.0	148.4	143.3*	178.4
5	90.2*	88.0*	86.4	85.6	104.0*	90.6	96.9	119.2	159.0	154.5	146.7*	173.9*
6	90.6	90.2	88.2	84.9	103.5	91.1	102.8*	118.7*	156.1	162.8	145.3*	173.1
7	92.0	85.2	86.9	89.3	105.5	90.2	105.5	111.6	157.3	165.2	146.9	162.6*
8	91.9*	82.1	85.1	91.6	103.8	90.3	106.7	102.8	157.0*	168.7	148.6	143.4
9	90.9	79.0	85.9	95.9	100.7	91.1	112.6*	97.0	155.2	183.7	156.1	135.1
10	89.2*	76.9	87.2	99.8	96.4	93.1	114.7	93.5	148.7	179.1	155.4	129.5
11	87.2	76.2	87.6	104.6	95.3	94.9	107.4	93.1	154.2	175.2	162.8*	133.8
12	83.3	75.8	86.5	107.6	100.8	91.4	111.0	92.1	159.8	169.8	156.2	138.2
13	84.2	77.8	89.0	112.9	98.5	94.8	100.6	90.3	151.2	160.9	145.6	140.2
14	82.3	76.8	87.5	110.2	98.9	97.9	93.7*	88.6	148.4	160.5	139.1	143.7
15	82.3	76.0	86.9	120.7	98.2	97.9	92.5	89.6	136.8	154.2	141.4	146.1
16	81.4	76.9	87.3	120.4	96.8	95.9	92.5	86.4	138.2	143.3	137.6	147.8*
17	82.4	76.5	87.1	120.6	94.9	100.4	91.1	83.8	125.9	135.4	133.4	143.8
18	84.3	76.9	88.6	120.5	95.4	102.0*	93.6	84.7	124.9	132.3	134.1	135.6
19	85.2	76.9	87.0	104.5	105.0	99.2	91.0	85.4	119.1	128.1	139.5*	133.6
20	86.9	80.1	88.7	100.8	99.6*	95.7*	88.7	87.0	122.2	125.3	138.1	132.3*
21	92.4	81.7	90.8	104.9*	98.6*	92.8	87.8	91.4	122.2	118.2	138.4*	132.7
22	90.8*	83.1	89.6	102.4	93.9	89.3	89.9	96.9	127.7	117.8	146.4	135.7*
23	99.4	85.8	86.8	99.3	87.3	88.0	91.2	99.6	131.8	116.4	162.9	142.9*
24	107.4	84.0	86.0	100.6	88.3	86.7	93.9	100.4	135.6	117.5	159.8	146.5*
25	113.8	86.0	87.7	98.8	88.1	84.7	96.3	103.3	139.3	118.2	159.1*	147.6
26	120.7	86.0	86.4	99.4	88.6	84.1	99.3	112.7	134.8	112.5	166.7	152.8
27	115.9*	85.4	85.4	100.0	88.5	83.8	98.3	116.4	137.5	114.1	172.8	150.6*
28	113.4	87.5	82.4	100.0	90.3*	85.6	98.9	127.7*	135.4	112.7	176.6*	147.1*
29	111.9	86.7	86.1	99.4	90.3	85.6	105.6*	132.2*		111.1	185.2	148.6
30	106.9	84.1	85.5	97.7	94.9	85.3	114.7	134.9		115.4*	182.1*	147.2*
31		80.4	84.7		95.9		120.2	133.3*		124.5		152.6
MEAN	94.5	83.7	86.4	100.9	96.3	91.6	98.9	106.1	141.8	140.3	150.5	149.7

* adjusted for burst

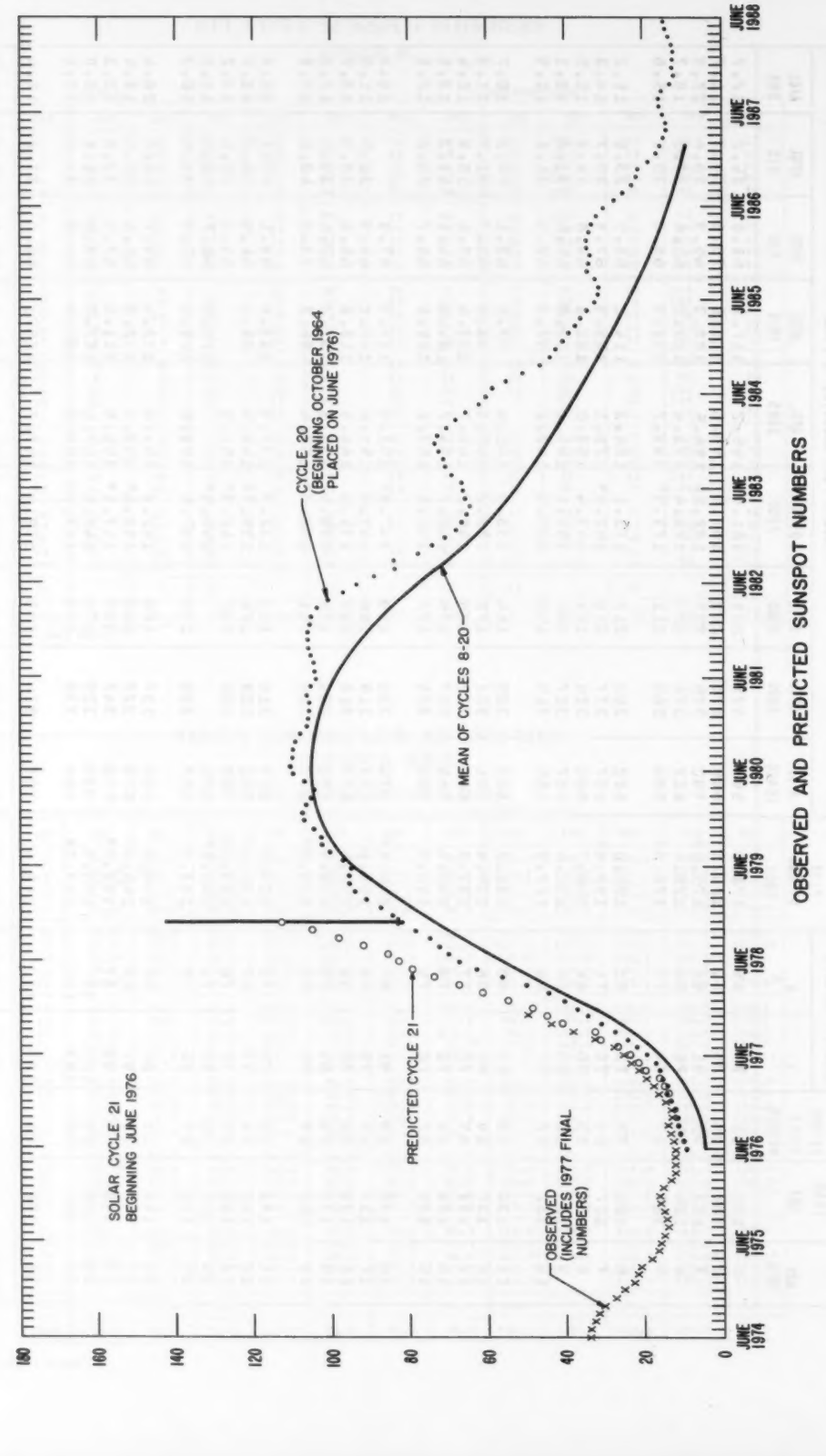
DAILY SOLAR INDICES

MAY 1978

MAY 1978	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.								
			R_Z	$R_{A'}$	OTTAWA 2800	AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	121	03	77	85	178.5	593	371	231	181.4	195.2	117.1	60.0	34.2	17.7
2	122	04	85	80	180.1	606	378	240	183.0	198.6	122.8	70.0	34.7	11.7
3	123	05	91	90	179.2A	592	375	233	182.2A	186.5	120.3	69.3	35.6	27.9
4	124	06	76	84	175.4	603	376	227	178.4	178.4	113.2	66.6	37.3	15.7
5	125	07	74	79	170.8*	588	369	211	173.9*	190.7	118.0	68.8	35.1	15.6
6	126	08	73	81	170.0	602	363	212	173.1	184.3	114.2	68.5	23.0	11.2
7	127	09	70	71	159.6*	607	377	210	162.6*	175.1	105.9	67.8	35.7	14.3
8	128	10	56	64	140.7	589	335	173	143.4	150.0	100.8	64.8	34.3	15.5
9	129	11	59	70	132.6	587	327	165	135.1	145.1	102.3	65.5	31.8	13.1
10	130	12	57	56	127.0	585	319	159	129.5	140.1	97.8	62.4	31.1	10.9
11	131	13	63	58	131.2	582	325	164	133.8	141.6	97.6	63.1	34.3	10.7
12	132	14	65	66	135.4	581	323	172	138.2	146.1	98.0	61.7	31.3	11.9
13	133	15	72	77	137.3	580	322	170	140.2	146.7	100.4	63.4	33.9	12.4
14	134	16	72	79	140.6	585	327	175	143.7	154.7	104.0	64.1	41.3	13.0
15	135	17	78	76	143.0	580	324	172	146.1	153.0	111.1	66.7	30.2	12.0
16	136	18	91	87	144.5*	574	321	169	147.8*	152.0	115.5	67.0		19.4
17	137	19	79	88	140.6	583	318	166	143.8	151.8	109.2	66.3	32.5	11.9
18	138	20	85	90	132.4	577	310	160	135.6	144.8	110.8	66.0	30.9	13.7
19	139	21	84	77	130.5	582	298	155	133.6	135.5	102.2	67.6	35.4	12.8
20	140	22	74	70	129.2*	577	316	161	132.3*	137.4	96.3	70.0	42.5	17.8
21	141	23	73	73	129.5	577	314	162	132.7	137.8	103.4	68.1	47.1	22.0
22	142	24	73	67	132.4*	582	333	174	135.7*	143.5	99.1	64.9	36.3	13.7
23	143	25	72	76	139.3*	592	336	182	142.9*	151.5		64.9	35.4	13.2
24	144	26	82	72	142.8*	596			146.5*		105.2	66.7	33.4	11.0
25	145	27	86	79	143.9	597	335	180	147.6	150.0	109.6	65.8	31.6	10.3
26	146	01	84	87	148.8	586	337	183	152.8	151.9	112.4	69.7	36.3	20.4
27	147	02	97	89	146.6*	579	327	183	150.6*	153.1	112.3	66.6	31.9	13.4
28	148	03	90	87	143.2*	598	347	193	147.1*	155.9	111.5	67.9	32.8	12.3
29	149	04	103	95	144.6	583	323	179	148.6	147.6	107.7	63.6	31.4	10.0
30	150	05	107	102	143.2*	584	329	178	147.2*	150.5	108.4	64.5	31.6	10.9
31	151	06	109	112	148.4	590	324	180	152.6	147.7	116.1	68.0	37.8	17.4
MEAN			79.3	79.6	146.5	588	336	184	149.7	156.6	108.1	66.1	34.3	14.3

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill are due to equipment problems.



OBSERVED AND PREDICTED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.2	13.2	12.2	12.6	12.5	12.2	12.9	14.0	14.3	13.4	13.5	14.8
1977	16.7	18.1	20.0	22.2	24.2	26.3	28.8	33.0	38.5	44.0	49.9	54.9
												(3)
1978	60.6	66.6	72.5	78.7	85.6	91.6	96.3	100.5	104.5	108.2	112.9	119.4
	(6)	(8)	(10)	(13)	(16)	(19)	(22)	(26)	(29)	(30)	(30)	(29)
1979	125.0	129.6	133.8	136.7	139.3	143.7	148.2	151.0	152.6	153.0	152.8	151.7
	(29)	(30)	(32)	(35)	(37)	(39)	(41)	(43)	(46)	(49)	(51)	(52)
1980	149.9	148.2	147.4	147.8	147.0	143.5	139.8	136.7	135.1	134.4	132.7	131.2
	(52)	(52)	(50)	(50)	(51)	(51)	(52)	(52)	(52)	(52)	(53)	(55)
1981	130.9	130.2	127.7	124.6	122.3	120.4	119.8	120.1	119.5	118.2	116.1	113.0
	(58)	(58)	(56)	(54)	(53)	(52)	(50)	(49)	(48)	(48)	(46)	(43)
1982	109.6	106.2	103.7	101.9	99.7	96.7	92.5	88.0	84.0	79.5	76.4	72.9
	(41)	(40)	(40)	(38)	(36)	(35)	(33)	(31)	(29)	(25)	(23)	(23)
1983	69.0	66.4	64.4	62.3	60.1	57.8	55.9	54.0	52.3	51.0	50.1	49.5
	(22)	(22)	(23)	(23)	(23)	(23)	(24)	(26)	(28)	(30)	(31)	(31)
1984	48.4	46.5	43.8	40.6	38.0	36.8	35.6	33.9	32.5	31.6	30.5	29.0
	(31)	(30)	(29)	(29)	(30)	(31)	(32)	(32)	(31)	(29)	(28)	(27)
1985	28.0	27.2	26.3	25.9	25.2	24.3	23.6	22.8	22.1	21.3	20.4	19.9
	(27)	(27)	(26)	(26)	(26)	(25)	(23)	(23)	(22)	(23)	(24)	(24)
1986	19.7	19.3	18.8	17.9	16.8	15.7	14.9	14.4	14.0	13.6	13.3	13.1
	(24)	(24)	(24)	(23)	(22)	(21)	(19)	(18)	(17)	(16)	(15)	(13)
1987	13.2	13.6	14.3	15.1	16.1							
	(11)	(11)	(11)	(11)	(13)							

The table gives observed Zürich smoothed sunspot numbers for Cycle 21 up to the one calculated from the latest observed data, marked by a vertical bar. They are based on final Zürich numbers through 1977 and provisional Zürich numbers thereafter. Some of these data after the June 1976 value will change slightly when final data for 1978 are received. The numbers after the vertical bar are predictions by the McNish-Lincoln method (see *Explanation of Data Reports*, February 1978). Shown in parentheses are the corresponding absolute values of the 90% confidence interval, an indication of the uncertainty above and below the predicted number.

The McNish-Lincoln method is very sensitive to the identification of a minimum epoch. In SGD 390-401 issues, the Cycle 21 predictions were based on March 1976 as the minimum epoch. Latest studies, including one published by Waldmeier, show that June 1976 is the more appropriate epoch of minimum. Thus, we have adopted a June 1976 mimimum.

*Prediction of Sunspot Maximum -- The McNish-Lincoln prediction method is recommended for predictions up to only one year ahead. From that point, the predictions regress rapidly towards the mean value. Combining this McNish-Lincoln prediction of sunspot maximum with the Ohl method (as done by Sargent, see *Explanation of Data Reports*, February 1978) indicates that the most probable value for sunspot maximum is 153 ± 38.

Hα SOLAR FLARES

MAY 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP. DAY	MIN.		CORD.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
	MAY																
MCMA	01	1109	1120	1150	N29	E12	.600	15266	2.4	41	SN		C	1120	100	1.3	E
MCMA	01	1307	1311	1322	N24	W02	.501	15266	1.4	15	SF		C	1311	35	.4	D
MCMA	01	1323	1324	1330	N21	E14	.505	15266	2.6	7	SF		C	1324	30	.4	D
MCMA	01	1332	1340	1400D	N18	W05	.415	15266	1.2	28D	SF		C	1340	30	.3	E
MCMA	01	1404	1406	1430	N32	E12	.639	15266	2.5	26	SB		C	1406	40	.5	D
MCMA	01	1455		1520	N26	W06	.538	15266	1.2	25	SN		C	1501	50	.6	E
MCMA	01	1541	1543	1551	S28	W74	.957	15252	27.1	10	SF		C	1543			D
MCMA	01	1646		1710D	S29	W74	.957	15252	27.1	24D	SF		C	1705			E
MCMA	01	1714	1715	1737D	N34	E23	.714	15266	3.4	23D	SB		C	1715	35	.4	E
MCMA	01	1727E		1747	N22	W08	.486	15266	1.1	20D	SB		C	1733	100	1.1	
PALE	01	1739	1743	1826	N16	W72	.964	15265	27.3	47	1B	3	C		167		
MCMA	01	1759E		1804D	S29	W74	.957	15252	27.2	5D	SF		P	1759			D
MCMA	01	1910E		2230	N21	W12	.492	15266	31.9	200D	2B		C	1953	450	5.2	UXYZ
MCMA	01	1955	1958	2030	S29	W77	.969	15252	27.1	35	SN		C	1958			E
MCMA	01	2045E	2046	2050D	S29	W77	.969	15252	27.1	5D	SN		C	2046			E
MCMA	01	2134	2138	2146	S29	W78	.973	15252	27.0	12	SN		C	2138			D
MCMA	01	2148	2155	2201	S29	W78	.973	15252	27.1	13	SF		C	2155			E
MANI	02	0048	0050	0100	N26	E03	.533		2.3	12	SN	3	V		100	1.1	F
MANI	02	0116E	0120	0209D	N26	E03	.533		2.3	51D	SN	3	V		150	1.7	F
MANI	02	0347E	0349	0409D	N30	W05	.594		1.8	22D	1N	3	V		210	2.6	FU
MANI	02	0616E	0616U	0623	S27	E76	.965		8.0	7D	SN	3	V		30	.7	
MANI	02	0639E	0640	0709	N30	W10	.607		1.5	30D	SB	3	V		150	1.8	F
MCMA	02	1050E		1155D	N25	W04	.520	15266	2.2	65D	SN		C	1055	50	.6	E
MCMA	02	1130	1146	1203	S29	W85	.992	15252	27.1	33	SN		C	1146			E
MCMA	02	1200	1221	1305	N25	W03	.518	15266	2.3	65	SB		C	1221	90	1.1	E
MCMA	02	1307	1308	1313	S29	W85	.992	15252	27.2	6	SB		C	1308			E
MCMA	02	1330	1340	1355D	N25	W05	.522	15266	2.2	25D	SN		C	1340	40	.5	E
MCMA	02	1420	1424	1429	N16	E72	.964	15282	8.0	9	SF		C	1424	20	.6	D
MCMA	02	1432	1439	1445	S29	W86	.994	15252	27.2	13	SN		C	1439			D
MCMA	02	1610	1612	1615	S27	E72	.947	15280	8.1	5	SB		C	1612	40	1.4	EV1611
MCMA	02	1815	1830	1930	N28	E24	.659	15266	4.6	75	SF		C	1830	60	.8	E
MCMA	02	2003	2012	2045	N15	E68	.943	15282	7.9	42	SN		C	2012	20	.6	D
MCMA	02	2205	2208	2215	N22	E03	.473	15266	3.1	10	SF		C	2208	25	.3	D
MANI	02	2314E	2314U	2326	N26	W07	.542		2.4	12D	SN	3	P		80	.9	F
MANI	03	0122	0128	0148	S32	W90	.998		27.3	26	1B	3	P				LIMBFL
MONT	03	0748E	0822	0931D	S31	W86	.993		27.9	103D	SN		C	0822	110		
MONT	03	0957	1001	1009	S31	W86	.993		28.0	12	SN		C	1001	50		D
MCMA	03	1126	1128	1135	S29	W90	.999	15252	27.7	9	SN		C	1128			CAPSUR
MCMA	03	1211E		1245D	N29	W28	.698	15266	1.4	34D	SN		C	1220	45	.6	E
MCMA	03	1228	1230	1242	N22	W27	.624	15266	1.5	14	SN		C	1230	100	1.4	E
MCMA	03	1346	1348	1410	S33	W90	.998	15266	27.8	24	SF		C	1348			SURGES
MCMA	03	1355	1420	1455D	N23	W23	.599	15266	1.9	60D	1N		C	1420	160	2.1	EK
MCMA	03	1411	1413	1418	N15	E57	.869	15282	7.9	7	SN		C	1413	30	.6	D
MCMA	03	1435	1442	1447	S32	W90	.998	15252	27.9	12	SF		C	1442			SURGES
MCMA	03	1500	1505	1655D	N20	W33	.665	15266	1.2	115D	SN		C	1505	80	1.1	EK
MCMA	03	1628	1628	1639	N24	W18	.572	15266	2.3	11	SN		C	1628	20	.3	D
MCMA	03	1655	1700	1735	N29	W31	.721	15266	1.4	40	1B		C	1700	250	3.6	F
MCMA	03	1815	1820	1842	N25	W25	.636	15266	1.9	27	SN		C	1820	60	.8	D
MCMA	03	1847	1855	2015D	N23	W27	.634	15266	1.8	88D	SN		C	1855	110	1.4	FK
MCMA	03	2020	2023	2056	N26	W20	.610	15266	2.3	36	SB		C	2023	120	1.5	E
MANI	03	2243E	2243	2252	N20	W40	.734		31.9	9D	SF	3	V		20	.3	
MANI	03	2243E	2244	2302	N24	W20	.587		2.4	19D	SN	3	V		80	1.0	F
MANI	04	0150	0152	0158	N25	W23	.621		2.4	8	1N	3	V		250	3.2	F
MANI	04	0259	0302	0309D	N20	W40	.735		1.1	10D	1N	3	V		150	2.2	F
MANI	04	0638E	0642	0705D	N20	W27	.606		2.3	27D	SN	3	V		150	1.9	F
BUCA	04	0639E		0655D	N21	W24	.588	15266	2.5	16D	1N		C	640	429	5.1	C
MONT	04	0952E	1003	1027	N20	W43	.763		1.2	35D	SN		C	1003	110		E
MANI	05	0338	0344	0401D	N18	W60	.899		31.7	23D	SF	3	P		40	.8	
RAMY	06	1140E	1146	1208D	N15	W80	.990		31.5	28D	SN	3	C		35		
RAMY	06	1214	1215	1225	S28	E26	.542		8.5	11	SN	3	C		36		H
RAMY	06	1225	1310	1407	N18	W49	.810		2.8	102	SB	3	C		44		
RAMY	06	1225	1256	1407	N18	W49	.810		2.8	102	SF	3	C		39		
RAMY	06	1255	1300	1441	N15	W80	.990		31.5	106	SF	3	C		53		
RAMY	06	1255	1306	1441	N15	W80	.990		31.5	106	SB	3	C		39		
RAMY	06	1501	1514	1520	N16	W78	.986		31.8	19	SB	3	C		49		
RAMY	06	1535	1543	1551	N19	W71	.963		1.3	16	SB	3	C		27		
PALE	06	1638E	1644	1656	N16	W71	.960		1.4	18D	SN	3	C		26		DE

Hα SOLAR FLARES

MAY 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
					APPROX.		CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY			CORD.	TYPE	TIME	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
	DATE MAY	START	MAX. PHASE	END	LAT.	MER. DIST.				MIN.				UT			
RAMY	06	1643	1645	1658	N20	W51	.835		2.9	15	SN	3	C		38		F
PALE	06	1645	1647	1702	N19	W56	.872		2.5	17	SB	3	C		43		DE
RAMY	06	1702	1705	1713	N16	W78	.986		31.9	11	SB	3	C		23		
PALE	06	1738	1800	1826	N20	W57	.882		2.5	48	SB	3	C		88		DE
RAMY	06	1739	1742U	1752	N17	W78	.986	15292	31.9	13	1B	3	C		0		
MANI	07	0336E	0336U	0355	N24	W68	.956		2.1	19D	2N	3	P		250	5.6	FZ
RAMY	07	1237	1241	1307	N18	W81	.994		1.5	30	SB	3	C		0		
RAMY	07	1318	1326	1346	N19	W67	.944		2.5	28	SB	4	C		27		
RAMY	07	1405	1413	1418	N19	W68	.949		2.5	13	SB	4	C		21		
RAMY	07	1425	1429	1433	N19	W68	.949		2.5	8	SB	4	C		22		
RAMY	07	1435	1439	1441	N18	W84	.998		1.3	6	SB	4	C		0		
MCMA	07	1436	1436	1445	N20	W90	1.001	15266	31.9	9	SF		C	1436			
MCMA	07	1455	1501	1504	N24	W90	1.001	15266	31.9	9	SF		C	1501			
MCMA	07	1512	1514	1522D	N22	W70	.962	15266	2.4	10D	SN		C	1514			D
RAMY	07	1531	1532	1539	N25	W80	.994		1.6	8	SB	4	C		0		
RAMY	07	1544	1612	1627	N18	W66	.937	15266	2.7	43	1B	4	C		247		FDE
RAMY	07	1544	1552	1627	N18	W66	.937		2.7	43	SB	4	C		102		FDE
MCMA	07	1552		1625	N22	W70	.962	15266	2.4	33	1N		P	1611	60	2.2	EK
PALE	07	2124E	2126U	2128D	N17	W87	1.000		1.4	4D	SB	3	C		0		DE
PALE	07	2228	2229	2240	N21	W72	.969		2.5	12	SN	3	C		39		F
MONT	08	0752	0812	0829	N16	W06	.395		7.9	37	SN		C	0812	80		E
TEHR	08	0808E	0810	0822	N17	W 7	.414		7.8	14D	SB	2	C		127		F
RAMY	08	1212	1248U	1312	N22	W76	.984	15266	2.8	60	2B	4	C		115		F
RAMY	08	1212	1216U	1312	N22	W76	.984		2.8	60	SB	4	C		45		F
RAMY	08	1441	1447	1502	N16	E46	.775		12.1	21	SB	4	C		32		F
RAMY	08	1441	1448	1502	N16	E43	.745		11.8	21	SB	3	C		32		
RAMY	08	1441	1454	1502	N16	E43	.745		11.8	21	SF	3	C		10		
RAMY	08	1739	1741	1752	N18	E57	.877		13.0	13	SB	3	C		63		
PALE	08	1744E	1744U	1748	N16	E55	.856		12.9	4D	SB	3	C		58		DE
PALE	08	2044E	2044U	2101D	N16	E53	.839		12.8	17D	SB	3	C		30		DE
RAMY	09	1442	1443	1508	N22	W90	1.001	15266	2.9	26	1B	4	C		0		
HERS	09	1442E	1442	1510	N21	W90	1.001		2.9	28D	1B		P				
PALE	10	2157E	2215U	2245D	N20	E40	.737	15294	13.9	48D	1N	3	C		221		U F
PALE	10	2157E	2204U	2245D	N20	E40	.737	15294	13.9	48D	1B	3	C		216		U F
MANI	10	2210E	2210U	2235	N17	E38	.699		13.8	25D	1F	3	V		150	2.1	U
PALE	11	0249	0251	0338	N20	E38	.718		14.0	49	SB	3	3		120		UF
PALE	11	0249	0309	0338	N20	E38	.718	15294	14.0	49	1F	3	C		314		U
TEHR	11	0254E	0300	0318	N20	E38	.718	15294	14.0	24D	1B	1	C		509		U F
RAMY	11	1532	1533	1538	N17	E13	.452		12.6	6	SN	3	C		40		F
PALE	11	2114	2116	2142	N19	E30	.631		14.1	28	SB	3	C		51		DE
PALE	11	2145	2153	2204	N19	E29	.621		14.1	19	SN	3	C		57		DE
PALE	11	2330	2334	2341D	N20	W 1	.449	15291	11.9	11D	1B	3	C		413		FDE
MANI	11	2330E	2335	2350	N18	W04	.422		11.7	20D	1N	3	P		200	2.2	FE
MITK	11	2339		2415	N20	E00	.448	15290	12.0	36	1B		P	2339	310	3.5	E
RAMY	12	1851	1852	1852D	N23	E18	.567		14.1	1D	SB	2	C		44		F
MANI	13	0742	0744	0747D	S26	W73	.950		7.8	5D	SN	3	P		80	1.8	
TEHR	13	0743	0751	0841	S28	W70	.935	15280	8.1	58	1B	1	C		350		F
TEHR	13	0743	0751	0806D	S28	W70	.935	15280	8.1	23D	1B	1	C		350		F
TEHR	13	0743	0751	0806D	N22	E60	.909		17.8	23D	1B	1	V		350		F
RAMY	13	1118	1137	1212D	N22	E57	.889		17.7	54D	SN	3	C		26		
RAMY	13	1307	1308	1317	S19	E16	.339		14.7	10	SB	3	C		21		
RAMY	13	1836	1838	1840	N13	W21	.480		12.2	4	SN	3	C		61		
PALE	13	2057	2138	2231D	N22	E55	.875		18.0	94D	SN	3	C		31		DE
PALE	14	0001	0038	0055	N22	E52	.853		17.9	54	SB	3	C		40		DE
RAMY	14	1116	1138	1152	N19	E70	.959		19.7	36	SF	3	C		30		F
RAMY	14	1116	1117	1152	N19	E70	.959	15300	19.7	36	1N	3	C		110		F
TEHR	14	1117E	1118	1135	N18	E67	.943		19.5	18D	SB	2	C		96		F

Hα SOLAR FLARES

MAY 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	14	1129	1131	1150	S20	E 4	.238		14.8	21	SB	3	C		53		F
TEHR	14	1131	1133	1149	S18	E 9	.246		15.2	18	SB	2	C		127		F
TEHR	14	1131	1133	1137D	S18	E 9	.246		15.2	6D	SB	2	V		127		F
RAMY	14	1251	1253	1303	N20	E45	.785		17.9	12	SB	3	C		80		F
TEHR	14	1254	1256	1304	N21	E41	.754		17.6	10	SN	2	C		159		F
RAMY	14	1354E	1355	1402	S28	W82	.984		8.4	8D	SB	3	C		0		F
RAMY	14	1454E	1455	1502	S28	W82	.984		8.5	8D	SB	3	C		0		F
RAMY	14	1611	1612	1623	S20	E 1	.229		14.7	12	SB	3	C		82		F
PALE	14	2139	2141	2155D	S27	E60	.868		19.4	16D	SB	3	C		35		U F
RAMY	14	2140	2141	2152	S26	E58	.851		19.3	12	SB	3	C		56		F
RAMY	15	1606	1610	1618	N21	E33	.678		18.1	12	SB	4	C		62		F
PALE	15	2220	2227	2234	S27	E46	.744		19.4	14	SB	3	C		50		FDE
TEHR	16	0454	0457	0502	S18	W20	.382	15296	14.7	8	1B	2	C		222		
RAMY	16	1234	1240	1254	S20	W23	.437		14.8	20	SB	4	C		94		
RAMY	16	1626E	1630U	1656D	N15	W56	.863	15291	12.5	30D	1B	3	C		301		
RAMY	16	1626E	1640U	1656D	N15	W56	.863		12.5	30D	1N	3	C		150		
PALE	16	1634E	1635U	1642D	N16	W56	.866	15291	12.5	8D	1B	3	V		159		FDE
PALE	16	1634E	1635U	1710	N16	W56	.866	15291	12.5	36D	1B	3	C		159		FDE
PALE	16	1706	1708	1722	N19	E19	.529		18.1	16	SN	3	C		61		U F
PALE	16	1758	1801	1836	N20	E15	.510		17.9	38	SB	3	C		124		FDE
MCMA	16	1852	1908	1915D	S19	W28	.497	15296	14.7	23D	SF		C	1908	60	.7	E
PALE	16	1856	1858	1910	S21	W27	.495		14.8	14	SN	3	C		36		DE
RAMY	16	1858	1901	1909	S20	W26	.476		14.8	11	SB	3	C		67		
MCMA	16	2025E		2026D	N26	E17	.599	15298	18.1	1D	SF		P	2026	40	.5	E
MANI	16	2300E	2302	2309D	S21	W27	.495		14.9	9D	SN	3	V		150	1.8	
RAMY	17	1233	1237	1342	S26	W84	.989		11.2	69	SB	4	C		24		
RAMY	17	1233	1327	1342	S26	W84	.989		11.2	69	SF	4	C		7		
MCMA	17	1434		1439D	S18	W38	.624	15296	14.8	5D	SF		C	1438	15	.2	DL
MCMA	17	1453E		1523D	S18	W38	.624	15296	14.8	30D	SN		P	1454	50	.7	EL
RAMY	17	1504	1505	1514	S26	E20	.454		19.1	10	SB	4	C		36		
MCMA	17	1507E		1523D	S24	E20	.434	15301	19.1	16D	SN		P	1508	50	.6	E
RAMY	17	1505	1507	1513	S26	W85	.991		11.3	8	SN	4	C		9		
RAMY	17	1521	1522	1527	S26	W85	.991		11.3	6	SB	4	C		9		
RAMY	17	2056	2057	2101D	N16	W70	.956		12.6	5D	SN	3	C		0		
RAMY	17	2118	2126	2135D	N19	W 1	.437		17.8	17D	SB	3	C		81		F
MCMA	18	1159E		1213D	N18	E33	.656	15303	21.0	14D	SF		P	1159	60	.8	
MCMA	18	1754E		1840D	N20	W01	.453	15298	18.7	46D	SN		C	1755	110	1.2	E
MONT	19	1002	1011	1021	S29	E03	.378		19.6	19	SN		C	1011	110		
MONT	19	1028	1034	1043	S24	W64	.895		14.6	15	SN		C	1034	50		D
MCMA	19	1037E		1054	S24	W62	.880	15296	14.8	17D	SN		P	1037	60	1.5	D
MCMA	19	1120E		1145D	N20	E20	.550	15303	21.0	25D	SF		C	1125	55	.6	E
RAMY	19	1220	1221	1227	S25	W62	.881		14.9	7	SB	3	C		21		
TEHR	19	1222E	1223	1229	S23	W60	.864		15.0	7D	SB	2	C		32		
MCMA	19	1328	1334	1343D	S24	W64	.895	15296	14.8	15D	SN		C	1334	45	1.2	E
MCMA	19	1517E		1600D	N21	E04	.473	15300	19.9	43D	1F		C	1518	220	2.4	E
MCMA	19	1532	1542	1555	S24	W67	.915	15296	14.6	23	SF		C	1542	30	1.0	D
MCMA	19	1720	1726	1740	S28	E03	.362	15301	19.9	20	SF		C	1726	50	.6	E
MCMA	19	1842	1856	1918	S24	W67	.915	15296	14.8	36	SN		C	1856	60	1.8	E
MANI	19	2343E	2343U	2355	S21	W76	.963		14.3	12D	2N	2	P		400	9.7	Z
MANI	20	0226	0236	0240	S25	W70	.933		14.9	14	1N	3	P		150	3.3	
MONT	20	0953	1007	1012	S24	W78	.971		14.6	19	SN		C	1007	50		D
RAMY	20	1128	1130	1135	S24	W78	.971		14.6	7	SB	3	C		13		
RAMY	20	1148	1151	1210	S24	W78	.971		14.6	22	SB	3	C		16		F
TEHR	20	1153E	1154	1157D	S23	W75	.959		14.9	4D	SB	2	V		64		
RAMY	20	1456	1457	1459	S24	W78	.971		14.8	3	SN	3	C		22		
RAMY	20	1602	1604	1607	S24	W79	.975		14.7	5	SN	3	C		17		
RAMY	20	1610	1612	1617	S24	W79	.975		14.7	7	SN	3	C		23		
RAMY	20	1807	1809	1812	S25	W79	.975		14.8	5	SB	3	C		21		

Hα SOLAR FLARES

MAY 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	21	1235	1238	1245	N25	W90	1.001		14.8	10	SB	4	C		0		
RAMY	21	1250	1251	1254	N17	E81	.994		27.6	4	SN	4	C		0		
RAMY	21	1316	1317	1319	N17	E81	.994		27.6	3	SN	4	C		0		
MCMA	21	1507E		1527D	N17	W10	.438	15303	20.9	200	SN		C	1515	30	.3	EH
MCMA	21	1614		1640	S29	W22	.503	15301	20.0	26	SN		C	1625	50	.6	E
RAMY	21	1636E	1636	1653	N18	E76	.982		27.4	17D	SN	3	C		9		
RAMY	21	1716	1721	1724	N18	E76	.982		27.4	8	SB	3	C		10		
MITK	22	0207		0224	S28	W44	.726		18.8	17	SN		C	0208			E
PALE	22	0210E	0211U	0215	S26	W43	.708		18.9	5D	SB	3	C		47		DE
RAMY	22	1433	1436	1443	S26	W44	.718		19.*	10	SB	3	C		102		
MCMA	22	1434	1436	1443	S28	W50	.784	15301	18.9	9	SN		C	1436	60	1.1	E
RAMY	22	1459	1509	1522	N19	E66	.940		27.6	23	SB	3	C		28		
MCMA	22	1501	1502	1547	N18	E72	.967	15314	28.0	46	SN		C	1502	40	1.6	E
RAMY	22	1522	1531	1531	N19	E66	.940		27.6	9	SB	3	C		33		
MCMA	22	1625	1628	1638	S26	W53	.807	15301	18.7	13	SB		C	1628	50	.9	E
RAMY	22	1626	1626	1633D	S26	W46	.739	15301	19.2	7D	1B	3	C		132		FDE
RAMY	22	1626	1626	1627D	S26	W45	.729	15301	19.3	1D	1B	3	V		132		
MCMA	22	1650	1651	1656	N21	E89	1.000	15314	1.4	6	SF		C	1651			
MCMA	22	1816	1844	1909	N18	W24	.566	15300	21.0	53	SB		C	1844	50	.6	E
MCMA	22	1835	1842	1910	N16	E72	.965	15314	28.2	35	SF		C	1842	25	1.0	D
MITK	23	0015	0027	0130	N18	E66	.938	15314	28.0	75	1N		C	0027	140		E
PALE	23	0024E	0024U	0107D	N18	E69	.954		28.2	43D	SB	3	C		40		DE
MANI	23	0031E	0032	0050	N17	E70	.958		28.3	19D	SN	3	V		80	1.8	
MONT	23	0801	0812	0839	S33	W07	.449		22.8	38	SF		C	0812	40		D
MONT	23	0845	0851	0911	N17	E65	.931	15314	28.2	26	1N		C	0857	250		
RAMY	23	1140	1141	1200D	N19	E53	.851		27.5	20D	SB	3	C		20		
MCMA	23	1613	1613	1615D	N22	E67	.950	15314	28.7	2D	SN		P	1613	20	.6	D
MITK	24	0439	0534	0640	S30	W03	.391	15314	24.0	121	1F		C	0534	220	2.5	EH
MCMA	24	1239E		1304D	S33	W14	.484	15305	23.5	25D	SN		C	1239	25	.3	DH
MCMA	24	1525	1530	1606	N20	E52	.847	15314	28.5	41	SN		C	1530	45	.8	EL
MCMA	24	1800E		1805D	S28	W83	.986	15301	18.5	5D	1N		C	1802			E
PALE	24	1901	1914	2023D	N17	E42	.743	15314	27.9	82D	1B	3	C		200		FDE
MCMA	24	1913E	1919	2108	N18	E42	.749	15314	28.0	115D	1B		C	1919	175	2.8	EL
PALE	24	2054E	2054U	2142D	N17	E41	.733		27.9	48D	SN	3	C		49		DE
TEHR	25	0941	0944	0952	N15	E29	.592		27.6	11	SB	2	C		95		
MCMA	25	1327	1332	1337	N22	W67	.950	15300	20.5	10	SF		C	1332	30	.9	E
MCMA	25	1401	1403	1405	N20	E75	.980	15319	3.2	4	SN		C	1403	15	.6	D
MCMA	25	1657	1708	1719	N21	E74	.978	15319	3.3	22	SN		C	1708	30	1.2	E
MCMA	25	1707	1733	1810	N21	E35	.700	15314	28.3	63	1N		C	1733	150	2.0	EL
PALE	25	1715E	1740	1755D	N18	E31	.638		28.0	40D	SB	3	C		87		FDE
PALE	25	1754E	1754U	1757D	N21	W64	.932		20.9	3D	SN	3	C		30		DE
MCMA	25	1807	1808	1816	N21	E75	.981	15319	3.4	9	SN		C	1808	15	.6	D
E	25	1837	1842	1853D	N16	E25	.558	15314	27.7	16D	SN		C	1842	40	.5	
MITK	26	0041	0047	0127	N25	E35	.730		28.7	46	SF		C	0047			E
MCMA	26	1103	1109	1118	N20	E65	.936	15319	3.3	15	SN		C	1109	25	.6	D
MCMA	26	1157	1205	1215D	N20	E19	.544	15314	27.9	18D	SN		C	1205	70	.8	E
MCMA	26	1241	1245	1315	N20	E64	.931	15319	3.3	34	SN		C	1245	20	.6	D
MCMA	26	1323	1332	1347	N20	E63	.925	15319	3.3	24	SN		C	1332	20	.6	D
MCMA	26	1443	1450	1458	N23	E10	.526	15314	27.4	15	SF		C	1450	40	.5	E
MCMA	26	1604	1607	1720D	N20	E61	.912	15319	3.2	76D	SN		C	1607	20	.6	DK
MCMA	26	1604	1645	1720D	N20	E61	.912	15319	3.2	76D	SN		C	1645	20	.6	DK
MCMA	26	1732	1751	1812	N20	E61	.912	15319	3.3	40	1B		C	1751	100	2.2	E
PALE	26	1744E	1800U	1813	N20	E61	.912	15319	3.3	29D	1B	3	C		148		DE
PALE	26	1807	1810	1813	N18	E16	.496		28.0	6	SN	3	C		50		DE
MCMA	27	1208	1211	1245D	N22	W04	.492	15314	27.2	37D	SN		C	1211	60	.7	E
MCMA	27	1230	1232	1242	N19	E07	.455	15314	28.0	12	SN		C	1232	30	.3	DL
MCMA	27	1256	1258	1304	N27	E23	.654	15316	1.3	8	SN		C	1258	30	.4	E
MCMA	27	1256	1259	1303	N22	E48	.823	15319	3.1	7	SN		C	1259	40	.7	E
MCMA	27	1620	1625	1700	N20	E48	.814	15319	3.3	40	SN		C	1625	80	1.4	EH
MCMA	27	2040	2041	2054D	N19	E03	.444	15314	28.1	14D	SN		C	2041	25	.3	D
MITK	28	0145	0154	0219	N26	E20	.622	15316	1.6	34	1N		C	0154	200	2.4	FH

Hα SOLAR FLARES

MAY 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
TEHR	28	0716E	0734	0748	N17	W 4	.415		28.0	32D	SB	3	C		127		F
TEHR	28	0716E	0719	0748	N17	W 4	.415		28.0	32D	SF	3	C		64		F
TEHR	28	1044E	1047	1101	N18	W 5	.433		28.1	17D	SB	2	C		95		F
MCMA	28	1057E		1120D	N18	W04	.431	15314	28.2	23D	SN		P	1057	100	1.1	BE
MCMA	28	1310	1317	1450D	N20	W13	.501	15314	27.6	100D	1B		C	1317	180	2.0	EFK
MCMA	28	1310	1333	1450D	N20	W13	.501	15314	27.6	100D	1B		C	1333	180	2.0	EFK
MCMA	28	1451	1504	1629	N18	W10	.455	15314	27.9	98	1B		C	1504	280	3.1	EFLX
MONT	29	1040	1105	1130D	N22	W08	.504		28.8	50D	SN		C	1105	220		
MCMA	29	1113E		1133	N21	W08	.489	15314	28.9	20D	SN		C	1113	80	.9	E
MCMA	29	1220	1223	1229	N22	E26	.626	15319	3.5	9	SF		C	1223	30	.4	E
MCMA	29	1512	1516	1526	N18	W23	.558	15314	27.9	14	SF		C	1516	20	.3	E
MCMA	29	1512	1515	1530D	N22	E23	.600	15319	3.4	18D	SN		C	1515	50	.6	E
RAMY	29	1720	1759	1836	N16	W25	.558	15314	27.8	76	1B	3	C		355		
RAMY	29	1720	1759	1802D	N16	W25	.558	15314	27.8	42D	1B	3	V		355		DE
PALE	29	1740E	1800U	1900D	N19	W21	.550	15314	28.2	80D	1B	3	C		475		DE F
PALE	29	2310E	2310U	2425D	N21	E17	.541		3.2	75D	SN	3	C		45		DE
PALE	29	2310E	2316U	2403D	S24	W58	.847		25.6	53D	SB	3	C		58		FDE
PALE	30	0411E	0412U	0413D	N21	W39	.738	15314	27.2	2D	1B	3	C		199		FDE
TEHR	30	0619	0623	0641	N20	E16	.522		3.5	22	SB	1	C		190		F
TEHR	30	0620	0631	0647	N18	W 6	.437		1.8	27	SN	1	C		95		F
TEHR	30	0620	0639	0647	N18	W 6	.437		1.8	27	SB	1	C		190		F
MONT	30	0655E	0725	0811	N16	W30	.612	15314	28.0	76D	1N		C	0725	440		
MONT	30	0655E	0712	0746	N22	E15	.540		3.4	51D	SN		C	0712	150		
TEHR	30	0716	0721	0813	N17	W26	.578	15314	28.4	57	2B	2	C		541		F
MONT	30	1001	1008	1014	N18	W30	.628		28.2	13	SF		C	1008	50		D
MONT	30	1109	1131	1149D	S30	E54	.823		6.5	40D	SN		C	1131	180		G
TEHR	30	1119	1123	1130D	N20	E16	.522		3.7	11D	SB	1	V		190		F
TEHR	30	1120	1123	1130D	N18	W16	.496		1.3	10D	SB	1	C		95		
MCMA	30	1152E		1250	S30	E53	.815	15300	6.5	58D	1F		C	1152	100	2.1	BE
MCMA	30	1233	1241	1310	N21	E12	.509	15319	3.4	37	SN		C	1241	80	.9	E
MCMA	30	1238	1241	1251	N21	W39	.738	15314	27.6	13	SF		C	1241	20	.3	DL
MCMA	30	1307	1309	1326	N22	W44	.789	15314	27.2	19	SN		C	1309	45	.7	E
MCMA	30	1336	1338	1354	N22	W23	.600	15314	28.8	18	SN		C	1338	40	.5	E
MCMA	30	1459E	1459	1518	N22	W23	.600	15314	28.9	19D	SN		C	1459	30	.4	DK
MCMA	30	1459E	1510	1518	N22	W23	.600	15314	28.9	19D	SN		C	1510	30	.4	DK
MCMA	30	1516	1523	1528D	N22	W45	.797	15314	27.3	12D	SF		C	1523	70	1.1	E
MCMA	30	1523		1551D	N18	W33	.659	15314	28.2	28D	SB		C	1532	90	1.2	E
WEND	30	1538E		1606D	N18	W33	.659	15314	28.2	28D	1N		V		500	6.8	
MCMA	30	1532		1551	N21	E11	.503	15319	3.5	19	SN		C	1539	40	.5	E
MCMA	30	1706E		1718D	N19	W37	.706	15314	27.9	12D	SF		C	1712	30	.4	EL
MCMA	30	1737	1739	1742	N27	E12	.590	15319	3.6	5	SN		C	1739	20	.3	E
RAMY	30	1756E	1800	1838	N21	E 6	.482		3.2	42D	SB	3	C		60		FDE
MCMA	30	1801E	1803	1809D	N20	E08	.475	15319	3.4	8D	SF		C	1803	50	.6	E
PALE	30	1927E	1927U	2027	N18	W36	.689	15314	28.1	60D	1B	3	C		278		UDE
PALE	30	2310E	2316U	2403D	S24	W58	.847		26.6	53D	SB	3	V		58		FDE
PALE	30	2310E	2316U	2403D	S24	W58	.847		26.6	53D	SB	3	C		58		FDE
MONT	31	0733E	0733	0802	N17	W43	.754		28.1	29D	SN		C	0733	180		
TEHR	31	0738E	0740	0753	N17	W42	.744		28.2	15D	SB	1	C		127		
MONT	31	0821	0832	0846	N16	W43	.749		28.1	25	SF		C	0832	60		E
MONT	31	1014	1053	1200D	N21	W41	.757	15314	28.4	106D	3B		C	1053	1700		FS
MCMA	31	1031E	1048	1450D	N20	W42	.760	15314	28.3	259D	2B		C	1048	360	5.4	BFU
WEND	31	1035E	1048	1308	N20	W40	.741	15314	28.4	153D	2N		P		1200		TW
RAMY	31	1044E	1106	1109D	N16	W48	.797	15314	27.8	25D	2B	3	C		804		U F
HERS	31	1103E	1130	1305	N20	W48	.814	15314	27.9	122D	3N		P				F
RAMY	31	1130	1132	1206	S16	W26	.452		1.5	36	SB	3	C		23		
RAMY	31	1427	1430	1447	N21	W 4	.477		3.3	20	SB	3	C		53		
RAMY	31	1621	1632	1651	N21	W57	.888		27.4	30	SB	3	C		52		
MCMA	31	1628	1632	1639	N22	W55	.877	15314	27.6	11	SF		C	1632	40	.8	E
RAMY	31	1646	1651	1703	S16	W28	.481		1.6	17	SN	3	C		23		
MCMA	31	1755	1758	1808	S17	W30	.513	15335	1.5	13	SF		C	1758	80	1.0	EL
MCMA	31	1812	1815	1821	N20	W07	.471	15319	3.2	9	SN		C	1815	50	.6	E
MCMA	31	1904	1905	1915	N22	W05	.495	15319	3.4	11	SN		C	1905	20	.2	D

Hα SOLAR FLARES

MAY 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
HCMA	31	2044E	2056	2110	N17	E52	.837	15333	7.8	260	SB		C	2056	25	.5	D

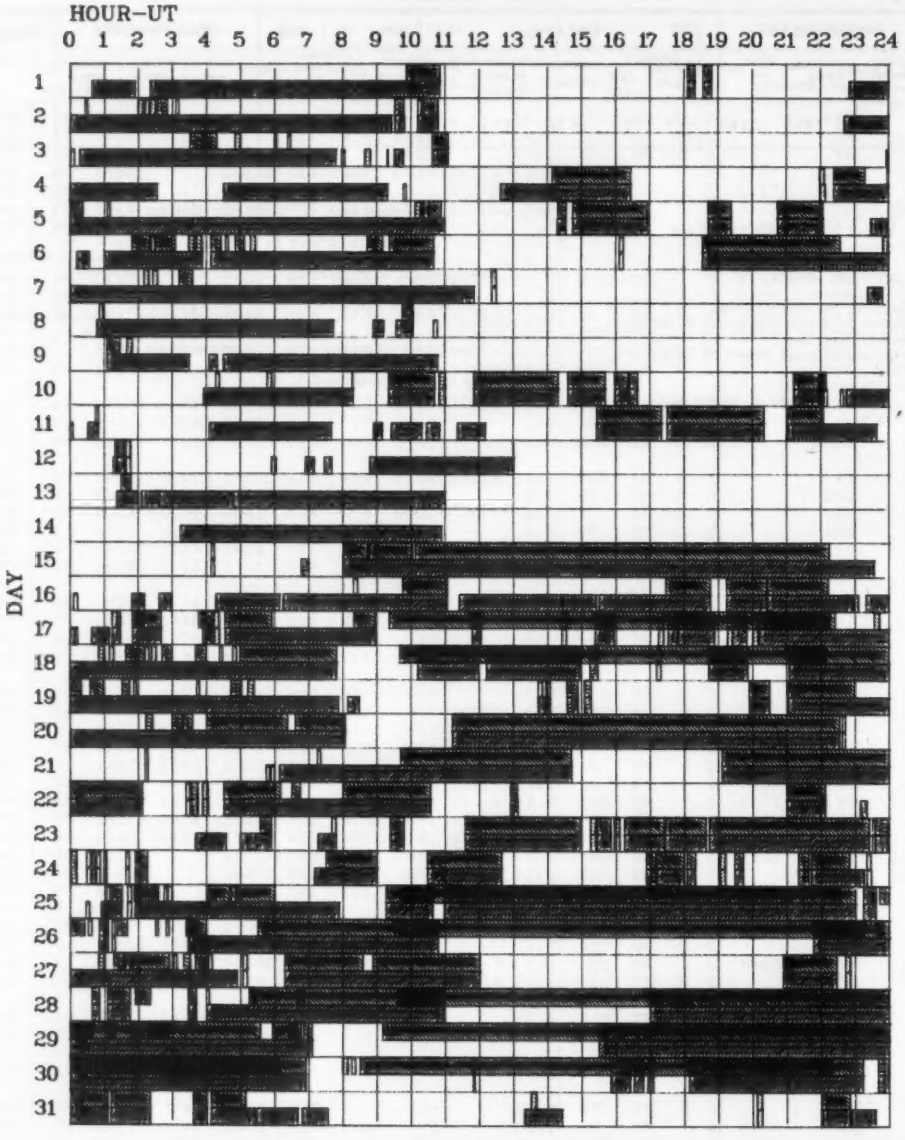
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

MAY 1978



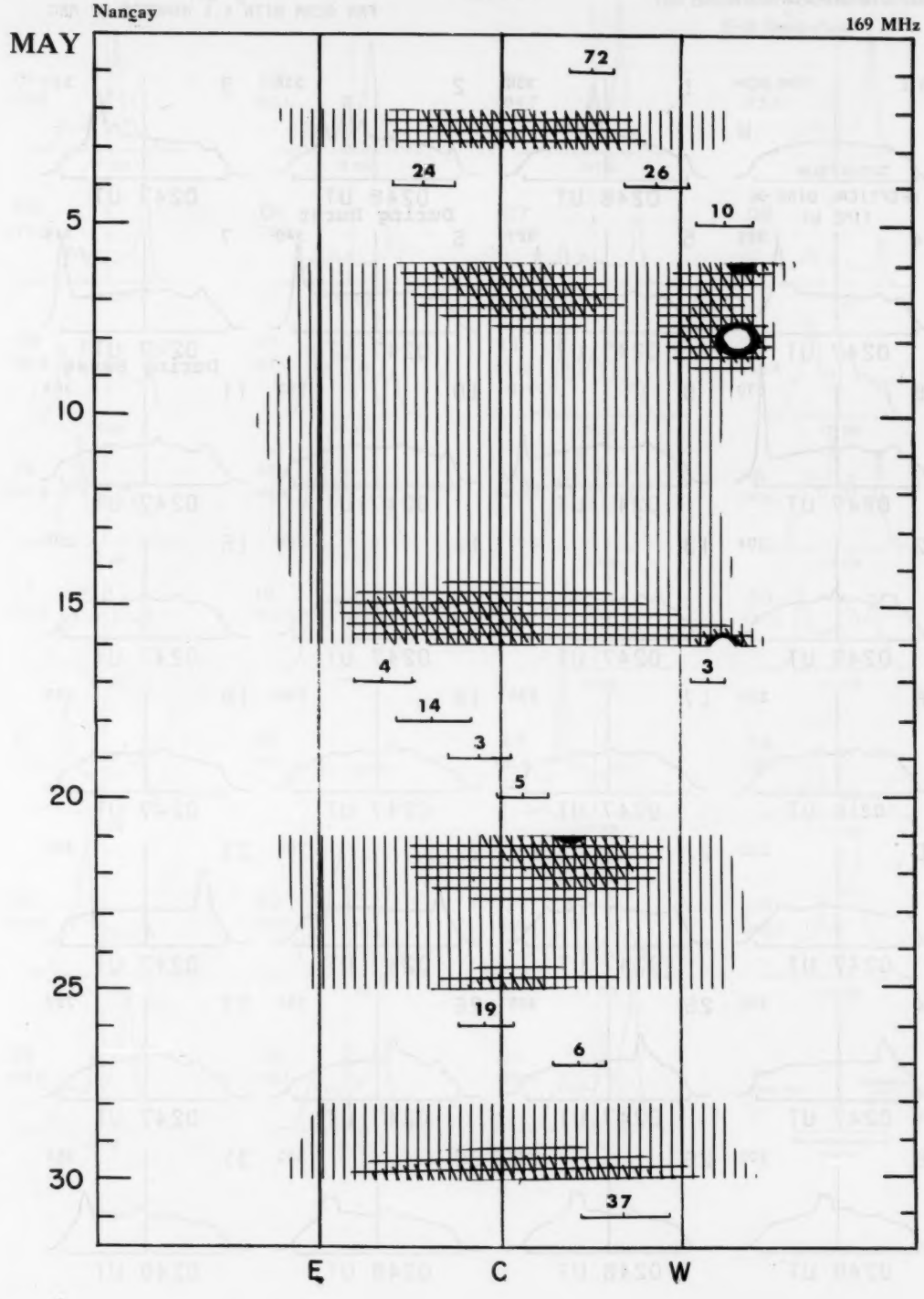
Observatories included in total patrol:

Bucharest	Istanbul	McMath-Hulbert	Monte Mario
Herstmonceux	Manila	Mitaka	Wendelstein

Times of no flare patrol are shown by the shaded area for each day, divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

MAY 1978



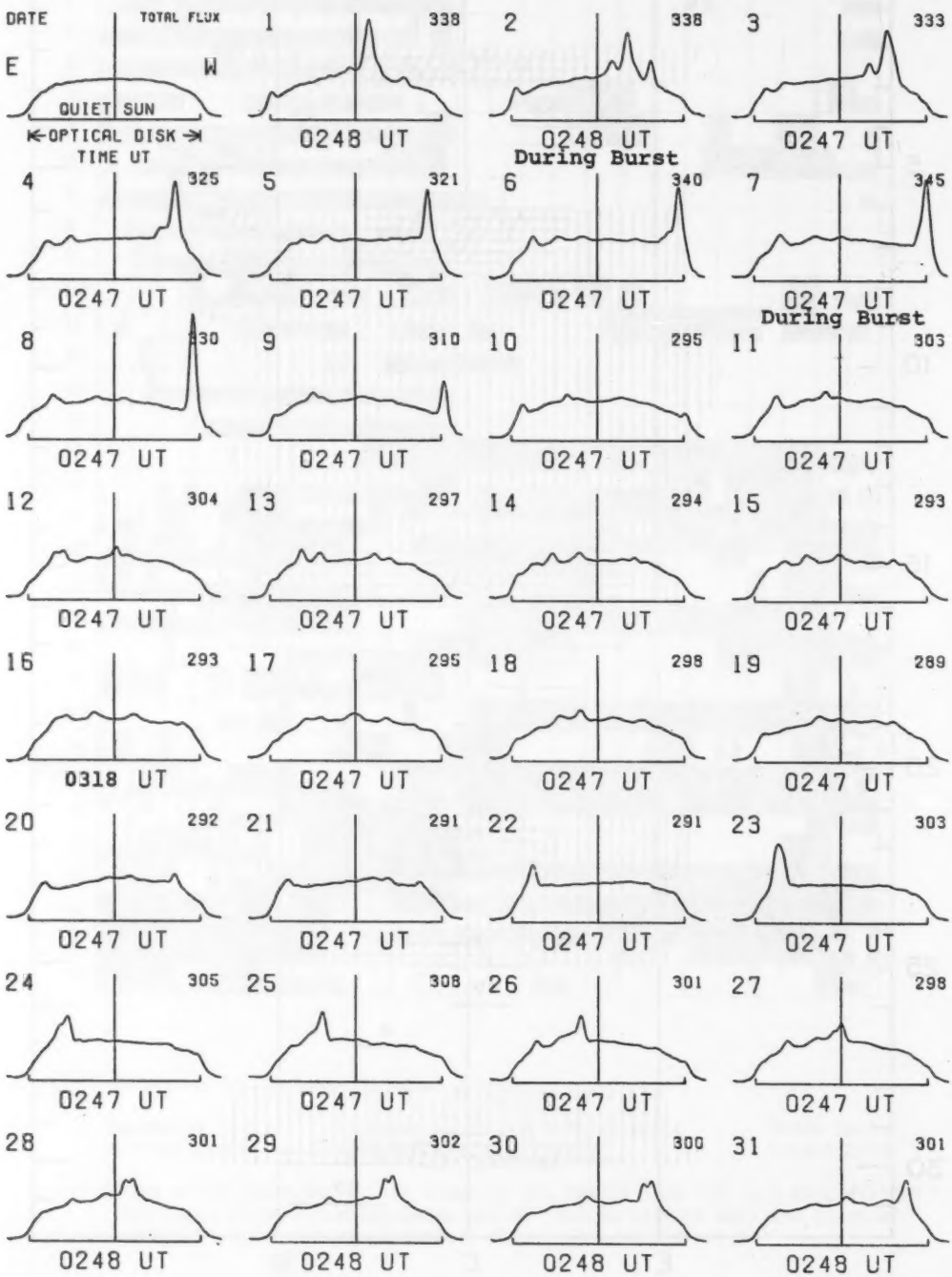
EAST-WEST SOLAR SCANS

MAY 1978

TOYOKAWA, JAPAN

3 CM

FAN BEAM WITH 1.1 MINUTES OF ARC

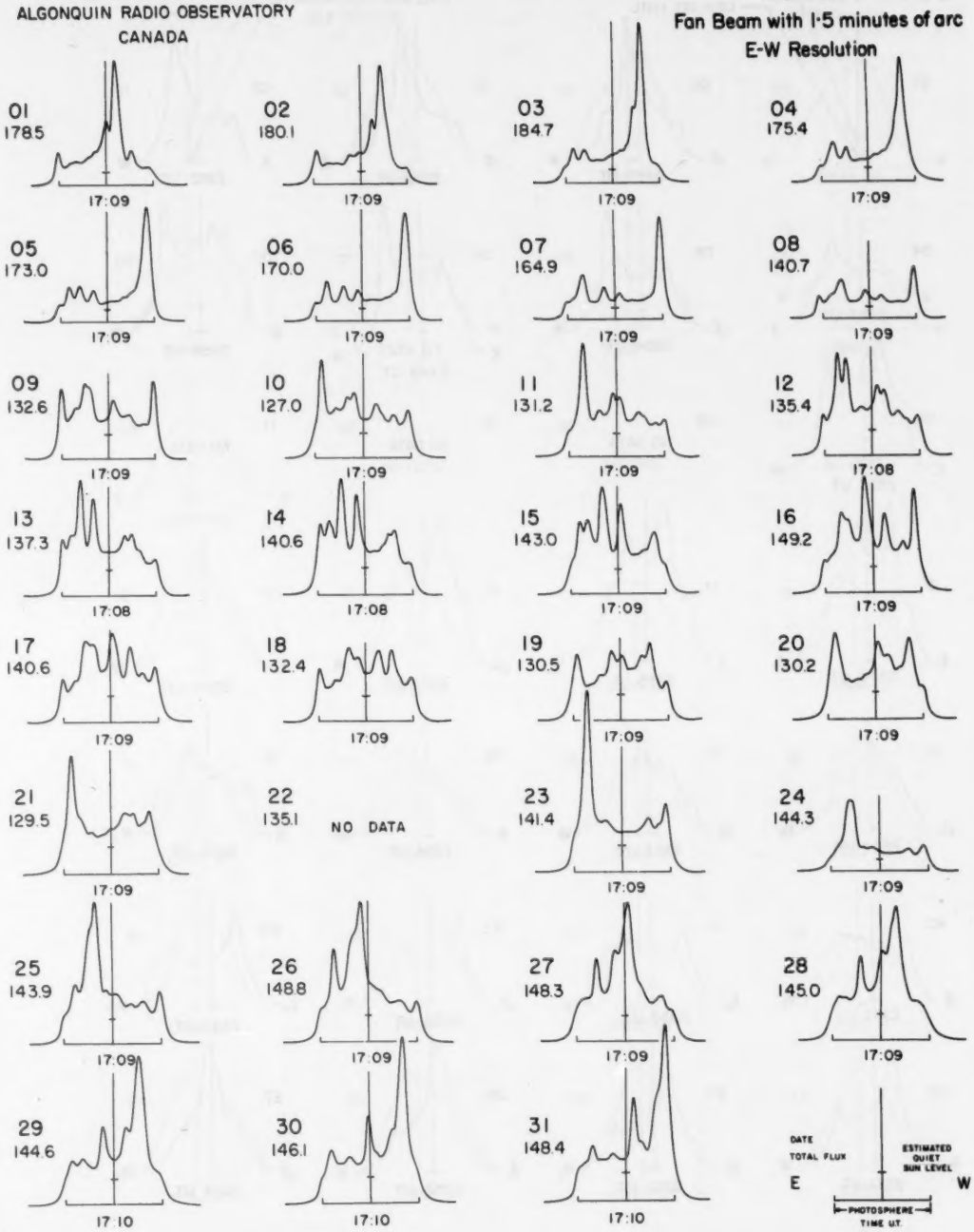


EAST-WEST SOLAR SCANS

MAY 1978

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution

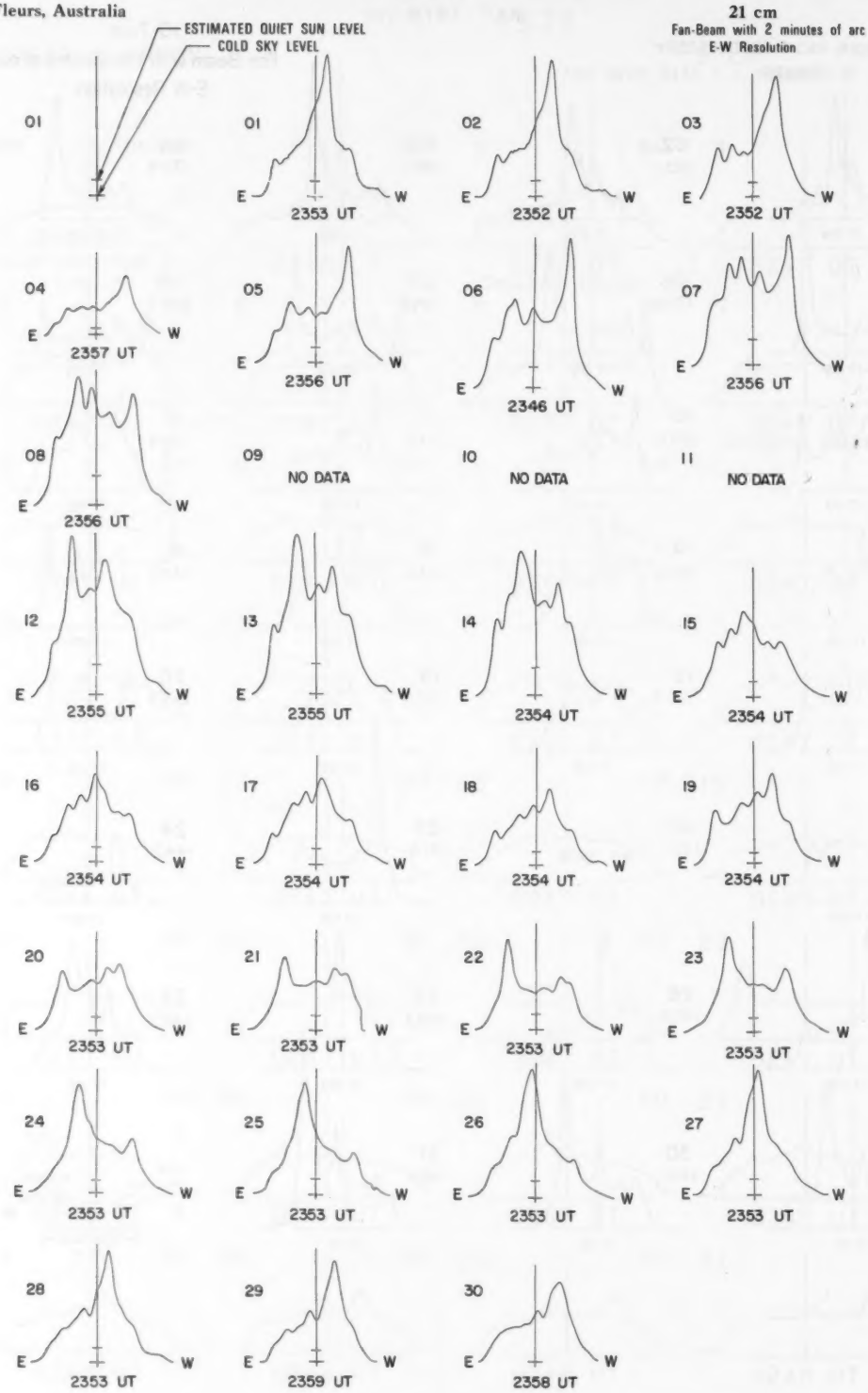


EAST-WEST SOLAR SCANS

MAY 1978

Fleurs, Australia

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution

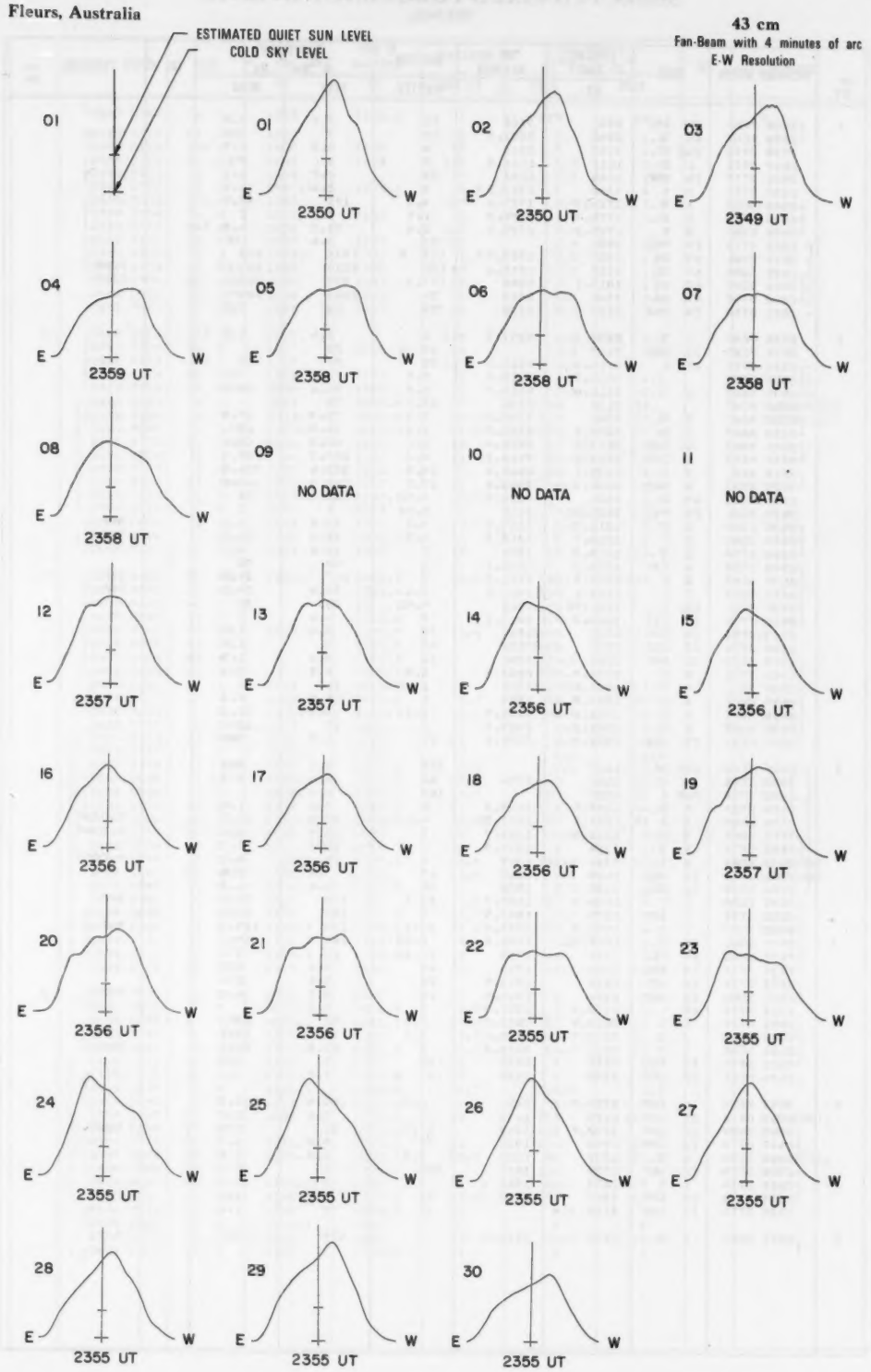


EAST-WEST SOLAR SCANS

MAY 1978

Fleurs, Australia

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
MAY 1978

MAY 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	REMARKS
1	2695	PENT	21 GRF	0045	0100	50	7.2	3.6		
	2695	PENT	45 C	0048	0052.5	10	9	4.4		
	2800	OTTA	240 R	1102	1110	8	5.8	2.9		
	2800	OTTA	1 S	1111	1111.5	5	6	3		
	2800	OTTA	20 GRF	1140	1147	30	2.2	1.1		
	2800	OTTA	1 S	1316	1317.5	3	2.8	1.2		
	8800	SGMR	3 S	1724.7	1725.4	6.3	108	43.2		
	2800	OTTA	1 S	1724.9	1725.5	1.5	8.2	2		
	2695	SGMR	3 S	1725.1	1725.5	2.9	11.2	4.5		
	2800	OTTA	28 PRE	1800		101	6.4			
	2695	BOUL	49 GB	1917 E	1923.5	113 D	1938	643		
	2695	SGMR	47 GB	1917	2015.1	128	2200	880		CONT
	8800	SGMR	47 GB	1917.1	1954	127.9	870	348		CONT
	2800	OTTA	47 GB	1941	2015	84	1665	584		
	2800	OTTA	29 PBI	2105	2105	200	23	7.2		
2	2695	PENT	1 S	0057.2	0057.5	2	8.4	4.2		
	2695	PENT	21 GRF	0107		40 D	20			
	2800	OTTA	45 C	0115.5	0118.5	20	77	22		
	2695	PENT		0116.5	0118.5	9.5	77			
	2695	MANI	3 S	0116.6	0118.7	8.5	89.4	59.6		
	2695	PENT		0126	0130	10.5	38			
	2695	MANI	3 S	0344	0345.9	5.3	23.3	15.5		
	8800	MANI	3 S	0345.8	0346.5	1.5	34.5	23		
	2695	MANI	4 S/F	0613.4	0614.4	6.7	60.3	40.1		
	8800	MANI	4 S/F	0613.6	0616.2	4.3	163.3	108.9		
	8800	MANI	3 S	0638.7	0640.6	14.9	502.4	334.9		
	2695	MANI	4 S/F	0638.7	0640.6	12.2	243.9	162.6		
	2695	BCUL	45 C	0106	0108.5	6.5D	31	10		
	2695	BOUL	28 PRE	0113.5E	0116	2.5D	5	2		
	2695	SGMR	3 S	1218.8	1219.9	5.2	13.5	4.1		SWF
	8800	SGMR	3 S	1219.7	1219.9	4.3	68.2	20.5		SWF
	2800	OTTA	3 S	1219.7	1220	2	14.6	4		
	2800	OTTA	4 S/F	1610.2	1611.1	3	98	25		
	2695	SGMR	3 S	1610.5	1611.2	3	117	34.9		SWF
	8800	SGMR	3 S	1610.6	1611.2	3.4	80.8	24.3		SWF
	2695	BCUL	45 C	1611.5E	1612	5.5D	95	32		
	2800	OTTA	29 PBI	1613.2	1613.2	7	4.4	2		
	2800	OTTA	20 GRF	1820	1840	70	3.6	1.8		
	2800	OTTA	20 GRF	2000	2025	60	3	1.5		
	2800	OTTA	21 GRF	2200	2201	30	3.8	1.9		
	2800	OTTA	8 S	2202.7	2202.8	0.5	1.8	0.9		
	2695	BCUL	3 S	2307.5E	2308	1 D	16	5		
	2695	PENT	3 S	2307.7	2308	1	16.6	8.3		
	8800	MANI	3 S	2308.1	2308.3	1.2	24.3	16.2		
	2695	MANI	3 S	2308.1	2308.3	1	15	10		
	2695	PENT	29 PBI	2308.8	2308.8	22	4.8	2.4		
3	2800	OTTA	27A RF	1115		255	4.4	3.6		
	2800	OTTA	24 R	1115	1155	40	4.4	2.2		
	2800	OTTA	24P R	1155		165	4.4			
	2800	OTTA	1 S	1158.5	1159.2	2	3.6	1.8		
	8800	SGMR	3 S	1227.7	1228.5	4.5	49.5	14.9		S,CONT
	8800	SGMR	3 S	1313.8	1314.7	3	28.5	8.6		4,CONT
	2800	OTTA	3 S	1314	1314.9	4	15.6	5.2		
	2695	SGMR	3 S	1314	1315	4	14	4.2		4,CONT
	2800	OTTA	20 GRF	1415	1419	17	7.6	2.6		
	2800	OTTA	26 FAL	1440	1530	50	-4.4	-1.5		
	2695	SGMR	3 S	1654.9	1657.7	23.7	179	71.6		SWF
	2800	OTTA	4 S/F	1655	1657.5	9	169	53.5		
	8800	SGMR	3 S	1656.2	1700.4	22.6	273	109.2		SWF
	2695	BOUL	46 C	1656.5E	1658.5	6.5D	165	55		
	2695	BCUL	29 PBI	1703	1703	20.5D	16	5		
	2800	OTTA	29 PBI	1704	1704	45	9.6	3.2		
	2800	OTTA	20 GRF	1814	1816.5	25	9.6	2.6		
	2695	SGMR	20 GRF	1814	1816.5	16	9.2	4.6		CONT
	2800	OTTA	40 F	1930.5	1931.9	3	5.8			
	2800	OTTA	3 S	2019.5	2020.5	2.5	67	23		
	8800	SGMR	3 S	2019.5	2020.6	5.5	98	39.2		CONT
	2695	SGMR	3 S	2020	2020.8	5	66.6	26.7		CONT
	2800	OTTA	29 PBI	2022	2022	14	8	2.2		
	2695	PENT	22 GRF	2355	2427	100 D	7.2			
4	8800	MANI	4 S/F	0255.9	0257	6.8	165.4	110.3		
	2800	OTTA	20 GRF	1125	1152	55	3.4	1.7		
	8800	SGMR	20 GRF	1242.2	1243	17.3	11	5.5		CONT
	2800	OTTA	21 GRF	1250	1310	70	9.4	4.7		
	2800	OTTA	1 S	1332	1333	2.5	3.6	1.6		
	2800	OTTA	21 GRF	1735	1820	100	3	1.5		
	2800	OTTA	1 S	1839	1840	2	3	1.5		
	2800	OTTA	20 GRF	1915	1923	30	3	1.5		
	2800	OTTA	20 GRF	2105		17	2	1.6		
5	8800	SGMR	3 S	1028	1028.5	7	450	180		S

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

MAY 1978

MAY 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	REMARKS
	2695	SGMR	3 S	1028	1028.5	7	200	80		5
	2800	OTTA	22 GRF	1210		130	3	1.5		
	2800	OTTA	240 R	1420	1435	15	3	1.5		
	2800	OTTA	21 GRF	1440	1448	110	4.8	2.6		
	2800	OTTA	1 S	1458		9	1.8	1.1		
	2800	OTTA	1 S	1527.5	1529.4	6.5	2	1		
	2800	OTTA	27A RF	1637		145	2.8	2.5		
	2800	OTTA	24 R	1637	1650	13	2.8	1.4		
	2800	OTTA	24P R	1650		115	2.8			
	2800	OTTA	20 GRF	1732	1737	15	2.6	1.3		
	2800	OTTA	1 S	1800.6	1801	1.5	2.8	0.9		
	2800	OTTA	26 FAL	1845	1902	17	-2.8	-1.4		
	2800	OTTA	20 GRF	2000	2023	52	2	1		
	2800	OTTA	22 GRF	2138	2207	95	5.8	2.7		
	2695	PENT	20 GRF	2320	2345	45	3.4	2.2		
6	2800	OTTA	27A RF	1217		225	3.8	3.3		
	2800	OTTA	24 R	1217	1245	28	3.8	1.9		
	2800	OTTA	24P R	1245		165	3.8			
	2800	OTTA	20 GRF	1300 1	3130	22	2.4	1.6		
	2800	OTTA	26 FAL	1530	1602	32	-3.8	-2.2		
	8800	SGMR	3 S	2013	2016.8	81	95	38		5,CONT,SWF
	2695	SGMR	3 S	2013.7	2016.8	80.3	172	68.8		5,CONT,SWF
	2695	PENT	4 S/F	2013.5	2016.8	11.5	150	46.6		
	2800	OTTA	30 PBI	2025	2025	75	11	5.5		
	2800	OTTA	3 S	2058	2102	11	14.4	5.8		
	2800	OTTA	3 S	2120	2121	3	26	8.6		
	2800	OTTA	23 GRF	2201	2227	55	9.4	2.4		
	2800	OTTA	1 S	2201.8	2202.5	2.5	4	1.5		
	2800	OTTA	1 S	2222	2223	3	3.6	2		
	2695	PENT	1 S	2300	2301	2.5	6.6	3.3		
	2695	BOUL	1 S	2300	2301.5	4	5	2		
	2695	PENT	26 FAL	2318	2350	32	-6.8	-3.4		
7	2695	MANI	47 GB	0321.7	0332.7	48.2	765	250		
	2695	MANI	47 GB		0335.4		740			
	2695	MANI	45 C		0353.1		196			
	2695	MANI	45 C		0356.8		176.4			
	8800	MANI	47 GB	0322.2	0328.5	39.4	3450	1175		NT
	8800	MANI	47 GB		0329.4		3450			
	8800	MANI	46 C		0352.8		171.5			
	8800	MANI	46 C		0358.5		169.7			
	2695	MANI	3 S	0418	0418.1	1	19.6	13.1		
	8800	MANI	3 S	0455.3	0455.8	2.7	78.8	52.5		
	2695	MANI	3 S	0455.3	0455.9	5.7	68.6	45.7		
	2800	OTTA	2 S/F	1227	1231	6	3.8	1.6		
	2800	OTTA	21 GRF	1500	1705	260	8.6	4.3		
	2800	OTTA	1 S	1533.5	1534	3	4.4	1.5		
	2800	OTTA	2 S/F	1543	1543.6	1.5	7.6	1.5		
	2695	SGMR	3 S	1543.5	1555.4	22.5	149	59.6		SWF
	8800	SGMR	3 S	1548.8	1553.8	16.2	155	62		SWF
	2800	OTTA	45 C	1549	1555.3	17	110	44.6		
	2695	BOUL	46 C	1550.5E	1556.5	30.5D	87	29		
	2800	OTTA	30 PBI	1606	1606	35	7.6	3.8		
	2800	OTTA	1 S	1609	1610	3	3	1.5		
	8800	SGMR	3 S	1700.6	1705.4	26.6	132.8	53.1		CONT,SWF
	2695	SGMR	20 GRF	1701.3	1707	13.9	6.8	2.7		CONT,SWF
	2695	PENT	1 S	1710	1710.5	2	2.8	1.4		
	2695	BOUL	4 SF	1735	1737	2.5	23	8		
	2695	SGMR	1 S	1758	1759.3	2.3	7.2	2.9		CONT
	8800	SGMR	3 S	1758.2	1759.2	1.8	10.3	4.1		CONT
	2800	OTTA	2 S/F	1758.3	1759.1	3.5	5.8	1.6		
	2695	BOUL	2 SF	1758.5	1759.5	2	6	2		
	2800	OTTA	26 FAL	2035	2100	25	-3.8	-1.9		
8	2695	PENT	1 S	0040	0042	5	6	2.6		
	2695	BOUL	1 S	0040.5	0042.5	6.5	7	2		
	2695	MANI	4 S/F	0159.6	0211.7	17.4	87	58		
	8800	MANI	4 S/F	0327.2	0328	2.5	47.7	31.8		I
	2695	MANI	4 S/F	0327.3	0327.9	4.2	64.7	43.1		
	2800	OTTA	21 GRF	1107	1315	230	8	4		
	2800	OTTA	2 S/F	1122.2	1122.6	3	4	1		
	8800	SGMR	3 S	1122.3	1122.6	4.7	20.8	8.3		
	2695	SGMR	1 S	1122.3	1122.6	4.8	5.7	2.3		
	8800	SGMR	47 GB	1204	1231.7	56	759	304		2,4,CONT,
	8800	SGMR	47 GB		1245.5		452			SWF
	2800	OTTA	45 C	1204.5	1246.8	62	114	33		
	2695	SGMR	45 C	1204.7	1231.7	55.3	86	55.2		2,4,CONT,
	2695	SGMR	45 C		1246.7		138			SWF
	2695	BOUL	45 C	1244.5E	1248	5 D	88	29		
	2695	BCUL	29 PBI	1249.5	1249.5	13.5D	42	14		
	2800	OTTA	1 S	1544	1544.5	2	5.6	2.6		
	2695	BCUL	1 S	1544.5	1545	2	5	2		
	2800	OTTA	26 FAL	1602	1645	43	-3.2	-1.5		
	2695	BCUL	40 F	1737	1740.5	4	5	2		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
MAY 1978

MAY 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2800	OTTA	1 S	1739	1739.8	2	3.4	1.2		
	2800	OTTA	20 GRF	1815	1855	125	2.6			
	2800	OTTA	20 GRF	2035	2100	65	1.6	0.8		
9	2800	OTTA	21 GRF	1430	1444	18	2.6	1.3		
	2800	OTTA	3 S	1432	1435.2	10	44.4	15.2		
	2695	SGMR	4 S/F	1432	1435.5	29	50	20		2,CONT,SWF
	2695	BOUL	20 GRF	1432.5	1436	16	44	15		
	8800	SGMR	4 S/F	1433	1436.9	20	176	70.4		2,CONT,SWF
	2800	OTTA	45 C	1450	1451.8	8	7.4	3.7		
	2695	BOUL	46 C	1450	1452.5	11.5	8	3		
	2800	OTTA	31 ABS	1458		250	-2.8	-1.4		
	2800	OTTA	26 FAL	2042	2112	30	-2.6	-1.3		
10	2800	OTTA	22 GRF	1610	1618	60	2.2	1.1		
	2800	OTTA	8 S	2155	2155	0.1	5			
	2800	OTTA	21 GRF	2200	2235	140	5	3.2		
	2800	OTTA	1 S	2204.5	2205.5	4	3.2	1.6		
	2695	BOUL	1 S	2205	2206.5	3.5	4	1		
11	2800	OTTA	20 GRF	1215	1235	50	2.2	1.4		
	2800	OTTA	240 R	1335	1400	25	2.2	1.1		
	2800	OTTA	20 GRF	1402	1530	165	2.8	1.4		
	2695	PENT	21 GRF	2325	2345	135	5	2.5		
	2695	PENT	3 S	2329.5	2331	4	11.8	5		
	2695	BOUL	4 SF	2330	2332	4.5	13	4		
12	2800	OTTA	8 S	1754.4	1754.4	0.2	23.6			
13	2695	HANI	3 S	0739.1	0742	10.8	105.1	70		
	2695	BOUL	2 SF	1658.5	1659	1.5	50	2		
	2695	BOUL	2 SF	1734.5	1735.5	2	3	1		
	2695	PENT	240 R	2215	2245	30	2	1.2		
	2695	PENT	27 RF	2345		65	1.2	0.9		
	2695	PENT	24 R	2345	2355	10	1.2	0.6		
	2695	PENT	24P R	2355		45	1.2			
	2695	PENT	26 FAL	2440	2450	10	-1.2	-0.6		
14	2800	OTTA	14 GRF	1055	1130	160	7	3.5		
	2800	OTTA	1 S	1250	1253.3	7	4	1.6		
	2800	OTTA	21 GRF	1346	1445	194	5	2.2		
	2695	SGMR	20 GRF	1350.6	1407.5	25	31.4	9.4		3G,SWF
	2800	OTTA	3 S	1400	1407	20	27.6	8.2		
	8800	SGMR	20 GRF	1401	1405.6	28	12.7	3.8		3G,SWF
	2695	BOUL	20 GRF	1401.5E	1408 U	12.5D	28	9		
	2800	OTTA	1 S	1611	1612	2	2.2	1		
	2695	BOUL	1 S	1611	1612.5	3	2	1		
	2695	BOUL	1 S	1658.5	1659	1.5	4	1		
	2695	BOUL	2 SF	1734.5	1735.5	2	3	1		
	2800	OTTA	1 S	2139	2140	4	1.6	0.8		
15	2800	OTTA	22 GRF	1555	1610	95	1.8	0.9		
	2695	BOUL	1 S	1916	1917	2	4	1		
	2800	OTTA	1 S	1916.1	1916.5	1.5	3.4	1.1		
	2800	OTTA	20 GRF	2217	2225	20	2	1		
	2695	PENT	24A R	2315	2325	18	2.6	1.3		
	2695	PENT	1 S	2317	2318.5	2	1.6	0.8		
16	2800	OTTA	1 S	1519	1519.5	1	1.4	0.7		
	2800	OTTA	21 GRF	1600	1635	170	8.2	4.1		
	2695	BOUL	4 SF	1610 E	1613.5	4.5D	26	9		
	2800	OTTA	45 C	1611.5	1612.4	8	20	64		
	2800	OTTA	1 S	1730	1731	6	1.2	0.6		
	2800	OTTA	20 GRF	1757	1801	25	5.6	1.9		
	2800	OTTA	1 S	1855.2	1856.5	5	1.6	0.8		
	2800	OTTA	8 S	1928.5	1928.8	0.5	1.6	0.8		
	2800	OTTA	27A RF	2110		230	2.6	2.2		
	2800	OTTA	24 R	2110	2145	35	2.6	1.3		
	2800	OTTA	24P R	2145		170	2.6			
	2800	OTTA	8 S	2156.9	2157.2	0.4	7.8	3.9		
	2800	OTTA	26 FAL	2435	2500	25	-2.6	-1.3		
17	2800	OTTA	22 GRF	1438	1510	80	5.8	2.9		
	2800	OTTA	20 GRF	2025	2125	230	3.6	1.6		
18	2800	OTTA	21 GRF	1100	1130	150	5	2.5		
	2800	OTTA	1 S	1158.5	1158.8	1.2	2.6	1.3		
	2800	OTTA	21 GRF	1750	1803	240	3	2.6		
	2695	SGMR	S	1751	1753.3	7	3 33.3	13.3		
	2695	BOUL	16 C	1751	1754	5	24	8		
	2800	OTTA	40 F	1751.5	1753.2	3	25			
19	2800	OTTA	20 GRF	1510	1550	80	1.8	1.4		
	2800	OTTA	20 GRF	1845	1940	70	1.8	1.4		
	2800	OTTA	20 GRF	2107	2125	85	3	2		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

MAY 1978

MAY 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2695	PENT	20 GRF	2300	2330	100	5.2	2.6		
20	2800	OTTA	1 S	1328	1330	8	1	0.5		
	2695	BOUL	1 S	1406	1407.5	3	3	1		
	2800	OTTA	21 GRF	1610	1655	100	2.6	1.3		
	2800	OTTA	1 S	1628.5	1630	2	1	0.5		
	2695	BOUL	45 C	1629	1630.5	5.5	2	1		
	2800	OTTA	45 C	1818.5	1820	2	2.6	1.3		
	2695	BOUL	40 F	1819.5	1821	3	1	0.3		
	2800	OTTA	20 GRF	1830	1845	150	2.6	1.3		
	2800	OTTA	240 R	2118	2125	7	2.6			
21	2695	BOUL	46 C	0048.5	0050.5	5.5	5	2		
	2695	MANI	4 S/F	0547.6	0548.5	6.2	82.9	55.3		
	8800	MANI	4 S/F	0548	0548.3	4	58.2	38.8		
	2800	OTTA	1 S	1701	1703.5	5	1.4	0.7		
	2800	OTTA	22 GRF	2045	2103	100	3.2	2		
	2695	PENT	22 GRF	2223	2255	70	1.4	0.7		
	2695	PENT	2 S/F	2349.2	2349.9	7	4.2	2.1		
22	2695	BOUL	21 GRF	0105.5E	0107.5	16.5D	30	10		
	2695	BOUL	28 PRE	0026	0037 U	39.5	19	6		
	2695	MANI	3 S	0204.3	0205	2.7	11.6	7.7		
	2695	BOUL	4 SF	1431.5	1434.5	5	13	4		
	2800	OTTA	2 S/F	1433	1434	3	7.4	2.6		
	2800	OTTA	23 GRF	1500	1727	235	5.2	2.3		
	2695	BOUL	1 S	1500.5	1502	2.5	4	1		
	2800	OTTA	4 S/F	1624	1624.5	3	25	8		
	2695	BOUL	4 SF	1624.5	1625	2	28	9		
	2800	OTTA	45 C	1837	1838	4.5	11	3.8		
	2695	BOUL	46 C	1837	1838	4.5	11	4		
	2695	PENT	21 GRF	2240	2517	180 D	17.4			
	2695	PENT	20 GRF	2414	2425	40	14.8	6.3		
	2695	PENT	4 S/F	2504.5	2507	10	34	11		
23	2695	MANI	3 S	0018.4	0022.5	13.6	15.8	10.2		
	2695	MANI	3 S	0104.6	0106.8	4.7	39.5	26.3		
	2800	OTTA	21 GRF	1445	1710	230	3.2	1.6		
	2800	OTTA	1 S	1610	1613	8	7.8	1.9		
	2695	BOUL	1 S	1612	1613.5	3	7	2		
	2800	OTTA	240 R	1948	1952	4	2	1		
	2800	OTTA	1 S	1953	1954.5	7	3	1.4		
	2695	BOUL	20 GRF	1953.5	1955.5	11.5	5	2		
	2800	OTTA	8 S	2038	2038.3	0.5	5.2	2.6		
	2800	OTTA	20 GRF	2100		120	2	1.4		
24	2800	OTTA	1 S	1250	1251.5	3	2.4	1.2		
	2800	OTTA	23 GRF	1350	1450	200	6.8	3.5		
	2800	OTTA	1 S	1602	1603.5	6	2.6	1.7		
	2800	OTTA	21 GRF	1750	1950	275	18	9		
	2695	BOUL	4 SF	1750.5	1755.5	11.5	21	7		
	2800	OTTA	4 S/F	1752	1754.1	6	12.2	4		
	2800	OTTA	3 S	1906	1911	14	52.8	26.4		
	2695	BOUL	20 GRF	1906	1912.5	19	50	17		
	2695	SGHR	3 S	1906.6	1910.5	19.4	59.2	23.7		
	8800	SGHR	3 S	1907	1911	18	41	16.4		
	2800	OTTA	29 PBI	1920	1920	30	16.4	8.2		
	2800	OTTA	1 S	2243	2243.5	2	3	1.8		
	2695	BOUL	2 SF	2243.5	2244.5	3	3	1		
25	2800	OTTA	21 GRF	1705	1729	180	10.4	3.2		
	2695	BOUL	28 PRE	1719	1741.5U	335	16	5		
	2800	OTTA	20 GRF	1736	1740	12	4.4	2.2		
	2800	OTTA	3 S	1752	1752.5	3	39.6	9		
	2695	SGHR	3 S	1752.2	1752.7	2.8	41.8	16.7		3,5
	2695	BOUL	3 S	1752.5E	1753.5	17 D	31	10		
	2800	OTTA	3 S	2251.8	2252.7	4	10	3.3		
	2695	MANI	3 S	2252	2252.6	1.7	11.8	7.9		
	2695	BOUL	1 S	2252	2253.5	3	8	3		
26	2695	PENT	20 GRF	0030	0048	70 D	15.6			
	2695	MANI	3 S	0045.1	0048	5.4	11.8	7.9		
	2800	OTTA	26A FAL	1105	1535	270	-12			
	2800	OTTA	21 GRF	1150	1205	125	6	3.6		
	2800	OTTA	2 S/F	1334	1336.2	5.2	5.8	2		
	2800	OTTA	22 GRF	1744	1748	25	3	1.5		
	2800	OTTA	21 GRF	1745	1822	185	5.6			
	2800	OTTA	45 C	1746.5	1750.2	13	80	14.6		
	2695	BOUL	41 F	1746.5	1754	26.5	47	16		
	2695	SGHR	45 C	1746.7	1750.2	23.8	91.5	36.6		3G,CONT,SWF
	2695	SGHR	45 C		1754.5		77.8			3G,CONT,SWF
	8800	SGHR	45 C	1747.2	1749.9	24	140.4	56.2		3G,CONT,SWF
	8800	SGHR	45 C		1754.5		85.4			3G,CONT,SWF
	2695	BOUL	28 PRE	2337.5	2342.5	5	3	1		
	2695	BOUL	1 S	2342.5	2344.5	4.5	9	3		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

MAY 1978

MAY 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2800	OTTA	1 S	2344	2345.3	4	4.4	2		
	2695	MANI	2 S/F	2344.6	2345.3	1.4	6.5	4.3		
27	2800	OTTA	1 S	1209	1210	4	2.4	1.2		
	2800	OTTA	1 S	1229.9	1230	2.5	7.6	1.9		
	2800	OTTA	22 GRF	1550	1625	90	3	1.5		
	2800	OTTA	22 GRF	2038	2045	12	1.2	0.6		
	2695	PENT	240 R	2125	2305	100	3.8	2.2		
	2695	PENT	1 S	2314	2317	10	1.6	1		
28	2695	PENT	20 GRF	0056	0105	35	7	3.5		
	2695	MANI	4 S/F	0714.3	0717.4	4.7	70.4	46.9		
	2695	SGMR	3 S	1039	1039.9	3.9	35	14		
	8800	SGMR	3 S	1040.2	1041.2	2.8	16.2	6.5		
	2800	OTTA	26 FAL	1105	1300	115	-5.8	-3		
	2695	SGMR	3 S	1306.5	1315.3	15	96.4	38.6		SWF
	2800	OTTA	23 GRF	1307	1604	233	16.2	11.6		
	2695	BOUL	4 SF	1312	1314	5	14	5		
	2800	OTTA	3 S	1313	1315	8	85.2	23		
	8800	SGMR	3 S	1313	1315.2	7	61.2	24.5		SWF
	2800	OTTA	46F C	1457	1501.3	7	34.2	18.5		
	8800	SGMR	3 S	1457.6	1501.5	8.9	370	113		SWF
	2695	SGMR	3 S	1458	1458.9	6.3	42.1	12.6		SWF
	2800	OTTA	29 PBI	1604	1604	40	14.8	7.4		
	2800	OTTA	32 ABS	1715	1735	53	-3.8	-2.2		
	2800	OTTA	21 GRF	1810	1820	240	8.8	4		
	2800	OTTA	21 GRF	1959.8	2004	25	2	1		
	2800	OTTA	1 S	2000.2	2001.2	1.5	3	1.5		
	2800	OTTA	21 GRF	2030	2036.5	50	3.6	1.8		
	2800	OTTA	8 S	2036.3	2036.3	0.2	53			
	2800	OTTA	20 GRF	2230	2235	30	2.4	1.2		
	2695	PENT	240 R	2305	2345	40	4.4	2		
29	2695	PENT	1 S	0016	0016.7	2	2	1		
	2695	PENT	3 S	0126	0127.8	6	12	4		
	2800	OTTA	28 GRF	1040		78	4.4	2.2		
	2800	OTTA	20 GRF	1505	1515	90	4.4	2.2		
	2800	OTTA	21 GRF	1650		195	4.6	2.3		
	8800	SGMR	3 S	1719.4	1720	2.6	58	23.2		
	2800	OTTA	1 S	1746	1747.5	4	3.6	1.8		
	2800	OTTA	3 S	1756.5	1757.8	5.5	205	46		
	2695	BOUL	4 SF	1756.5	1758	8	140	47		
	8800	SGMR	3 S	1756.8	1758.2	6.7	230	92		SWF
	2695	SGMR	3 S	1757	1758.1	6	253	101		SWF
	2800	OTTA	29 PBI	1802	1802	38	11.6	3.8		
	2695	BOUL	29 PBI	1804.5	1804.5	30.5	5	2		
	2800	OTTA	23 GRF	2105	2200	105	4.4	2.2		
	2800	OTTA	1 S	2242	2242.5	1.5	4.4	2.2		
	2695	PENT	20 GRF	2310	2410	110	2.8	1.4		
30	8800	MANI	3 S	0713.2	0714.3	3.4	77.6	49.8		
	2695	MANI	3 S	0713.5	0721	13.5	31.5	20.9		
	2800	OTTA	240 R	1120	1130	10	2.8	1.4		
	2800	OTTA	21 GRF	1135	1142	150	5.6	2.8		
	2800	OTTA	1 S	1306.8	1308	3	3	1.5		
	2800	OTTA	23 GRF	1450	1530	80	12	4		
	2695	BOUL	45 C	1520.5	1522	9	5	2		
	2800	OTTA	1 S	1521.5	1522.3	3	2.8	1.4		
	2800	OTTA	3 S	1526	1528	4	17.6	6.6		
	2800	OTTA	20 GRF	1615	1635	65	3.4	2		
	2800	OTTA	21 GRF	1750	2120	300	5.6	2.8		
	8800	SGMR	47 GB	1924.8	1926.4	16.2	612	245		SWF
	2695	BOUL	1 S	1925.5	1926.5	3	8	3		
	2800	OTTA	3 S	1925.5	1926.7	6	77.8	33.6		
	2695	SGMR	3 S	1926.6	1926.7	14.4	78.2	31.3		SWF
	2695	BOUL	29 PBI	1929.5	1933	26	4	1		
	2800	OTTA	29 PBI	1931.5	1931.5	40	18.8	5.8		
	2695	PENT	20 GRF	2335	2350	50	2.8	1.6		
	2695	BOUL	46 C	2336.5	2337.5	3	26	9		
31	2695	MANI	4 S/F	0733.5	0734.6	4.3	14.3	4.7		
	8800	MANI	3 S	0733.7	0734.8	3.5	104.9	34.9		
	8800	SGMR	3 S	1016	1052	59	84.2	33.7		SWF
	2695	SGMR	3 S	1020	1043	55	123	49.2		SWF
	2800	OTTA		1047	1053.9	373 D	135			
	2800	OTTA	26 FAL	1900	1925	25	-4.2	-2.1		
	2695	PENT	21 GRF	2330	2417	125	3.4	1.7		
	2695	PENT	1 S	2406	2408	6	7.4	3.7		

Observatories:

BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

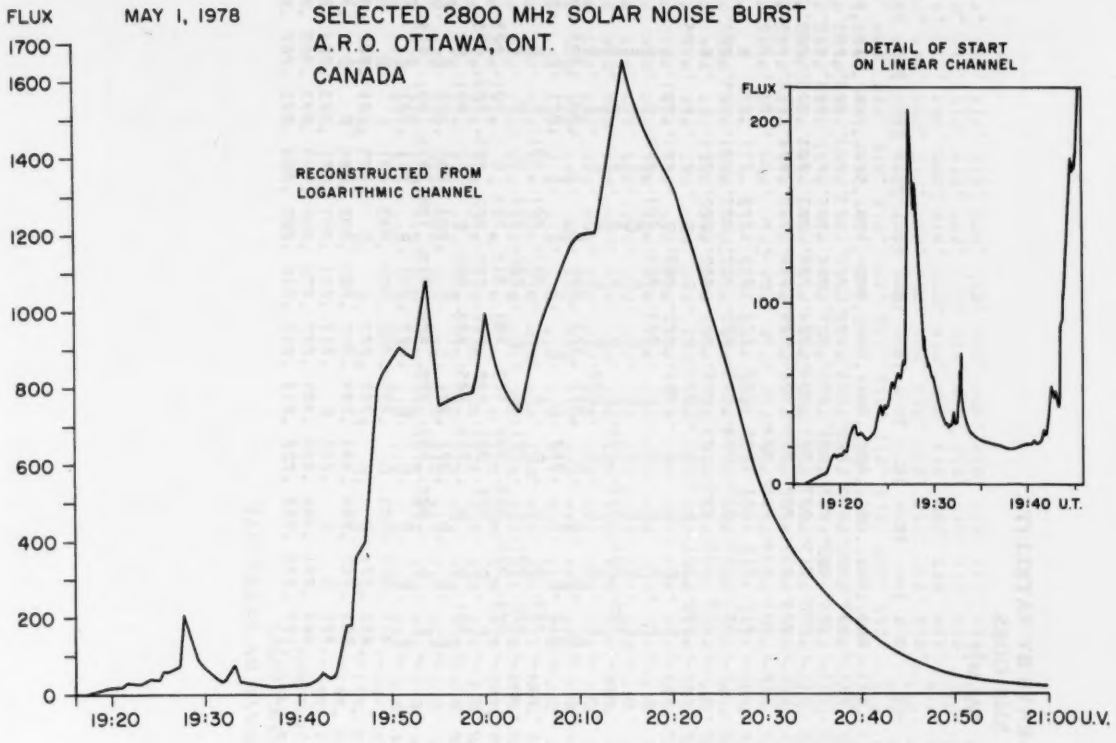
Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

Errata: An error appears on page 26 of SGD, 405 Part I, May 1978 issue. April 28, 1978 Ottawa peak flux density of the great burst beginning at 1308 UT should read "24,000" instead of "2000".

SELECTED SOLAR NOISE BURST

MAY 1, 1978



SOLAR X-RAYS BY SATELLITE
SMS GOES
MAY 1978

.5 - 4Å Hourly Averages (10^{-5} watts/m^2)

MO	DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
5/	1	.003	.003	.002	.001	.001	.002	.003	.001	.002	B	.001	.003	-.005	.001	.001	.002	.001	.004	.002	.520	.576	.068	.012	.004	.050
5/	2	.003	.006	.031	.011	.002	.005	.016	.003	.016	.003	.002	.003	- .007	.002	.002	.002	.003	.002	.002	.003	.003	.002	.003	.006	.009
5/	3	.002	.006	.005	.011	.008	.003	.003	.005	.003	.004	.002	.023	- .006	.002	.003	.002	.006	.027	.006	.006	.012	.003	.012	.002	.007
5/	4	.014	.028	.010	.010	.007	.002	.011	.005	.002	.004	.004	.001	- .002	.013	.007	.003	.004	.004	.006	.003	.003	.003	.002	.002	.006
5/	5	.004	.001	.001	.002	.001	.001	.003	.002	.002	.002	.019	.002	- .003	.002	.002	.005	.006	.009	.010	.012	.004	.006	.015	.009	.005
5/	6	.002	.006	.007	.001	.011	.009	.017	.011	.002	.003	.002	.002	- .003	.004	.006	.004	M	M	M	M	M	.031	.012	.015	.008
5/	7	.008	.012	.010	.890	.171	.052	.040	.015	.027	.027	.026	.008	- .017	.015	.031	.095	.208	.174	.011	.012	.011	.004	B	.005	.081
5/	8	.394	.112	.219	.038	.024	.008	.015	.008	.003	.003	.006	.018	- .553	.063	.013	.004	.003	.002	.002	.002	.001	.005	.003	.018	.063
5/	9	.005	.010	.017	.010	.015	.001	.002	.001	B	.002	.002	B	- .027	.003	.429	.105	.006	.002	.002	.002	.001	B	B	B	.026
5/10		B	B	B	.003	.001	B	B	.003	.005	.003	.002	.002	- .002	.001	B	B	.004	B	B	B	B	B	.005	.001	.002
5/11		B	B	.001	.005	B	B	B	B	.002	.003	.002	.001	- B	B	B	B	.001	.002	.003	B	.001	.001	B	.003	.001
5/12		.001	B	B	B	.002	.001	.001	B	B	B	B	B	- B	B	B	B	B	.001	.064	.001	.003	B	B	B	.003
5/13		.002	B	.001	B	B	B	B	.011	.008	.001	B	B	- B	B	B	B	B	B	B	B	B	B	B	B	.003
5/14		B	B	B	B	B	B	B	B	B	B	B	.006	- .002	.003	.010	.001	B	B	B	B	B	B	P	B	.001
5/15		B	B	B	B	B	B	B	B	B	B	B	B	- B	B	B	B	.002	B	B	B	B	B	B	B	.001
5/16		B	B	.001	B	.002	B	B	B	B	B	B	P	- B	B	B	B	.012	.003	.002	B	B	.001	.006	.001	.002
5/17		B	B	.001	B	.001	B	B	B	B	B	B	B	-.010	B	B	.030	B	B	B	B	B	.001	B	B	.001
5/18		B	B	.003	B	B	B	.003	.001	B	B	.001	.004	- .007	B	B	B	B	B	.002	.001	.001	B	B	B	.002
5/19		B	B	B	B	B	B	.001	B	.003	B	.002	.001	- .002	.001	B	.001	B	B	.002	.004	M	M	M	M	.001
5/20		M	.004	.003	B	.001	.001	.001	.002	.001	.003	.005	.003	- .003	.003	.002	.002	.002	.001	.012	.003	B	.001	.003	.002	.003
5/21		.002	.002	B	B	.002	.012	.007	.001	.002	.003	.002	B	- B	B	.002	.001	.002	.012	.002	.002	.005	.004	.003	.002	.003
5/22		.001	B	.007	B	.002	.003	.001	.005	.002	.001	.002	B	- .001	B	B	.012	.005	.003	.002	B	B	.001	P	.002	.002
5/23		.098	.061	.004	B	B	B	.001	.001	.001	.002	B	B	- B	B	B	.001	.001	B	B	.003	.005	.002	B	B	.008
5/24		B	B	.002	B	B	.002	.002	.002	.001	B	B	B	- B	B	.002	.002	.002	.008	.010	.108	.015	.001	.002	.001	.007
5/25		.001	.001	B	.004	.001	.003	.005	.001	.002	.002	.001	B	- B	B	B	B	B	.005	.001	B	.001	.001	B	B	.001
5/26		.004	.002	.001	.001	.001	.003	.035	.050	.026	.015	.009	.003	-.016	.007	N001	B	.002	.066	.008	.003	.001	B	B	B	.012
5/27		B	.002	.001	.003	B	.003	.006	B	.006	.003	.016	.001	-.002	.001	B	B	.009	.002	B	B	.005	.001	.002	.003	.003
5/28		.001	.003	.002	.002	.002	.001	.001	.018	.004	.002	.019	.003	-.001	.062	.080	.403	.008	.002	.002	.002	.006	B	B	.001	.026
5/29		.003	.003	.001	.001	.001	B	.002	.00	.001	P	.005	.006	-.001	B	B	.003	B	.017	.291	.001	.001	.003	.001	.002	.006
5/30		.001	B	B	B	.004	.002	.036	.250	.013	.002	.005	.002	-.003	.001	.002	.020	.001	.002	.002	.099	.003	.003	.002	.001	.019
5/31		.002	.002	.002	B	.001	.002	.001	.007	.002	B	.248	.496	-.187	.070	.033	.020	.014	.013	.010	.005	.004	.002	.002	.003	.047

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE
SMS GOES
MAY 1978

1 - 8Å Hourly Averages (10^{-4} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
5/ 1	.018	.018	.014	.012	.012	.013	.017	.013	.012	.011	.012	.019	-.014	.012	.013	.014	.013	.027	.013	.296	.462	.122	.047	.027	.051
5/ 2	.020	.112	.079	.033	.016	.019	.031	.015	.037	.018	.015	.014	-.018	.013	.014	.015	.014	.013	.015	.014	.017	.015	.017	.022	.017
5/ 3	.014	.020	.022	.033	.030	.021	.020	.022	.019	.019	.016	.033	-.025	.014	.018	.013	.027	.042	.020	.022	.028	.016	.028	.013	.014
5/ 4	.033	.049	.029	.026	.019	.016	.026	.027	.014	.014	.016	.012	-.014	.032	.022	.019	.018	.016	.024	.014	.014	.015	.012	.013	.013
5/ 5	.020	.012	.012	.012	.013	.012	.015	.012	.013	.012	.035	.014	-.014	.018	.019	.023	.022	.029	.031	.032	.021	.022	.038	.030	.012
5/ 6	.020	.025	.029	.018	.035	.030	.040	.040	.019	.019	.016	.015	-.021	.025	.026	.023	M	M	M	M	M	.073	.042	.043	.018
5/ 7	.031	.042	.038	.499	.172	.084	.073	.045	.059	.066	.058	.112	-.046	.038	.054	.086	.202	.191	.044	.035	.033	.024	.018	.022	.004
5/ 8	.174	.161	.197	.084	.055	.036	.033	.031	.022	.020	.027	.042	-.344	.104	.040	.023	.020	.018	.018	.019	.018	.023	.021	.041	.064
5/ 9	.023	.027	.037	.030	.031	.019	.033	.011	.010	.011	.011	.010	-.044	.017	.224	.119	.023	.017	.015	.012	.010	.009	.008	.007	.029
5/10	.008	.007	.007	.012	.011	.009	.007	.009	.015	.013	.010	.009	-.008	.008	.008	.009	.014	.009	.007	.007	.007	.006	.021	.009	.006
5/11	.006	.005	.008	.021	.007	.006	.006	.006	.008	.011	.012	.010	-.009	.009	.008	.009	.008	.010	.011	.008	.008	.008	.007	.013	.005
5/12	.010	.006	.006	.007	.010	.009	.008	.007	.007	.006	.006	.007	-.007	.008	.007	.007	.007	.008	.011	.008	.062	.006	.006	.007	.006
5/13	.010	.006	.009	.006	.006	.006	.006	.023	.027	.010	.007	.007	-.005	.006	.005	.005	.005	.005	.006	.006	.005	.005	.005	.006	.005
5/14	.006	.005	.005	.005	.006	.005	.005	.005	.006	.006	.005	.023	-.012	.010	.027	.010	.008	.007	.006	.007	.006	.006	.006	.006	.005
5/15	.006	.005	.005	.006	.007	.007	.008	.007	.007	.006	.006	.005	-.006	.005	.005	.005	.010	.006	.006	.005	.005	.005	.006	.006	.005
5/16	.006	.005	.008	.006	.008	.006	.006	.008	.007	.007	.008	.006	-.007	.006	.006	.006	.031	.015	.012	.007	.007	.010	.011	.010	.005
5/17	.009	.007	.008	.007	.009	.008	.008	.006	.007	.010	.008	.006	-.017	.008	.007	.030	.007	.006	.006	.006	.007	.008	.006	.005	.006
5/18	.005	.005	.013	.006	.005	.008	.013	.009	.007	.005	.008	.016	-.018	.007	.005	.004	.005	.005	.010	.008	.008	.006	.006	.005	.005
5/19	.005	.006	.006	.007	.007	.007	.010	.008	.010	.007	.010	.009	-.010	.009	.008	.009	.006	.007	.009	.013	M	M	M	M	.005
5/20	M	.014	.011	.007	.009	.009	.009	.010	.010	.012	.016	.013	-.036	.013	.011	.010	.012	.010	.023	.016	.008	.010	.014	.011	.008
5/21	.010	.011	.008	.008	.009	.017	.023	.010	.008	.012	.012	.008	-.008	.008	.010	.010	.012	.031	.014	.014	.020	.023	.016	.013	.008
5/22	.010	.010	.016	.010	.012	.014	.010	.024	.013	.010	.012	.010	-.011	.009	.009	.029	.020	.026	.015	.009	.008	.009	.008	.011	.008
5/23	.086	.103	.025	.011	.008	.007	.008	.009	.009	.011	.009	.007	-.007	.008	.008	.010	.011	.010	.008	.010	.017	.012	.009	.009	.012
5/24	.009	.008	.011	.008	.008	.013	.011	.011	.010	.009	.008	.007	-.007	.007	.014	.012	.011	.015	.027	.102	.048	.019	.011	.010	.011
5/25	.010	.010	.009	.014	.010	.012	.019	.011	.010	.021	.010	.007	-.007	.007	.007	.007	.007	.016	.009	.007	.008	.009	.008	.008	.006
5/26	.014	.016	.009	.008	.007	.012	.051	.035	.069	.047	.031	.022	-.035	.028	.013	.010	.011	.056	.025	.013	.010	.008	.008	.008	.010
5/27	.007	.010	.007	.010	.007	.010	.020	.008	.012	.011	.029	.008	-.010	.007	.006	.007	.019	.010	.007	.007	.008	.008	.010	.007	.007
5/28	.008	.022	.009	.009	.008	.007	.006	.024	.011	.009	.027	.015	-.014	.058	.053	.265	.029	.011	.011	.010	.015	.008	.008	.008	.026
5/29	.012	.012	.009	.010	.009	.008	.010	.009	.009	.009	.014	.020	-.010	.007	.008	.014	.008	.018	.099	.010	.009	.013	.010	.010	.010
5/30	.008	.007	.007	.007	.014	.011	.060	.217	.046	.014	.014	.012	-.015	.011	.010	.030	.010	.011	.013	.008	.019	.015	.012	.010	.023
5/31	.010	.010	.010	.007	.008	.009	.008	.015	.010	.008	.172	.587	-.303	.137	.077	.052	.038	.034	.029	.022	.019	.017	.016	.013	.056

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE

GOES

MAY 1978

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
6	2119	2.5E-07	7.1E-06	2123	8.2E-07	1.2E-05	2127	3.7E-07	9.2E-06
7	0321	1.4E-07	4.3E-06	0331	3.6E-05	1.7E-04	0344	1.2E-05	8.5E-05
7	0521	5.9E-07	8.7E-06	0527	1.3E-06	1.3E-05	0530	7.3E-07	1.1E-05
7	0625	2.3E-07	6.0E-06	0633	1.6E-06	1.5E-05	0638	6.0E-07	1.0E-05
7	0854	2.0E-07	5.9E-06	0858	9.0E-07	9.9E-06	0901	2.2E-07	6.8E-06
7	1111	2.1E-07	5.6E-06	1117	2.3E-06	1.9E-05	1139	8.5E-07	1.2E-05
7	1236	1.3E-07	4.1E-06	1239	6.7E-07	7.6E-06	1241	2.2E-07	5.4E-06
7	1432	1.4E-07	4.1E-06	1443	7.5E-07	8.7E-06	1505	3.0E-07	6.3E-06
7	1548	1.9E-07	5.1E-06	1600	7.2E-06	4.4E-05	1613	2.1E-06	2.3E-05
7	1702	1.4E-06	1.6E-05	1712	4.5E-06	3.5E-05	1724	1.8E-06	2.5E-05
7	1902	9.1E-08	3.4E-06	1908	2.8E-07	6.4E-06	1913	1.3E-07	4.7E-06
8	0645	1.3E-07	3.3E-06	0653	5.4E-07	5.7E-06	0706	1.5E-07	4.5E-06
8	1202	1.3E-07	4.0E-06	1239	1.0E-05	6.0E-05	1254	3.4E-06	3.2E-05
8	1701	1.1E-08	1.6E-06	1706	1.0E-07	2.7E-06	1711	2.5E-08	2.1E-06
8	1914	6.7E-09	1.7E-06	1918	9.3E-08	2.5E-06	1921	2.8E-08	2.1E-06
9	0409	4.5E-08	2.1E-06	0415	9.7E-07	7.9E-06	0420	2.6E-07	4.9E-06
9	0953	4.2E-08	1.4E-06	0956	5.1E-08	2.1E-06	0958	4.8E-08	1.5E-06
9	1201	2.9E-08	1.3E-06	1222	7.4E-07	8.0E-06	1238	2.0E-07	4.5E-06
10	0344	7.0E-08	1.6E-06	0347	1.0E-07	1.2E-05	0350	6.5E-08	1.7E-06
10	0448	2.2E-08	1.0E-06	0451	2.3E-08	7.6E-06	0453	1.9E-08	1.0E-06
10	0630	6.3E-09	7.7E-07	0634	2.1E-08	1.5E-06	0636	6.1E-09	7.6E-07
10	0734	1.2E-08	8.8E-07	0748	7.5E-08	2.1E-06	0752	7.8E-08	1.4E-06
10	0809	9.8E-08	1.7E-06	0812	9.9E-08	1.2E-05	0817	9.4E-08	1.9E-06
10	0818	9.2E-08	1.8E-06	0822	1.6E-07	1.8E-05	0825	8.7E-08	1.8E-06
10	1337	6.0E-09	8.4E-07	1340	1.4E-08	1.3E-06	1342	2.4E-08	8.6E-07
10	1441	2.7E-09	7.6E-07	1446	1.3E-08	1.1E-06	1448	2.9E-09	7.7E-07
10	1451	1.0E-08	7.5E-07	1456	2.2E-08	1.3E-06	1515	1.1E-08	1.0E-06
10	1612	3.5E-08	1.0E-06	1616	1.3E-07	1.1E-05	1623	1.0E-07	2.0E-06
10	2200	6.2E-09	6.5E-07	2213	1.3E-07	3.4E-06	2235	2.8E-08	1.9E-06
11	0247	4.7E-09	6.8E-07	0304	1.1E-07	3.1E-06	0331	1.9E-08	1.9E-06
11	1509	6.2E-09	7.9E-07	1513	3.7E-08	1.3E-06	1519	1.5E-08	1.0E-06
11	1651	9.5E-09	8.1E-07	1700	1.0E-07	2.1E-06	1709	3.3E-08	1.4E-06
11	1733	6.4E-09	7.0E-07	1737	2.1E-08	1.0E-06	1742	9.8E-09	8.4E-07
11	2328	9.5E-09	8.6E-07	2348	7.9E-08	2.3E-06	2356	2.3E-08	1.5E-06
12	0507	1.0E-08	8.2E-07	0512	5.6E-08	1.3E-06	0520	1.8E-08	1.0E-06
12	2350	8.0E-09	6.5E-07	2357	5.3E-08	2.1E-06	0000	3.3E-08	1.3E-06
13	0735	1.1E-08	8.4E-07	0748	4.1E-07	6.5E-06	0816	1.3E-07	3.6E-06
14	1111	3.3E-08	1.6E-06	1119	1.6E-07	3.9E-06	1136	6.4E-08	2.7E-06
14	1251	8.9E-09	7.9E-07	1256	4.1E-08	1.3E-06	1302	1.4E-08	1.0E-06
14	1345	1.6E-09	5.2E-07	1403	3.9E-07	5.9E-06	1418	9.9E-08	3.0E-06
14	1609	6.1E-09	7.7E-07	1613	5.8E-08	2.0E-06	1616	2.8E-08	1.3E-06
14	2137	3.2E-09	5.8E-07	2142	3.3E-08	1.0E-06	2147	1.0E-08	8.1E-07
15	2315	3.3E-09	5.4E-07	2323	6.5E-08	1.4E-06	2326	2.0E-08	9.4E-07
16	0444	3.1E-09	5.4E-07	0447	1.9E-07	2.4E-06	0450	4.3E-08	1.3E-06
16	2146	2.4E-08	1.2E-06	2149	4.3E-08	1.9E-06	2151	3.1E-08	1.4E-06
16	2253	1.5E-08	1.1E-06	2256	4.1E-08	1.8E-06	2300	2.1E-08	1.3E-06
17	0355	1.4E-08	8.1E-07	0400	5.3E-08	1.2E-06	0410	1.9E-08	1.0E-06
17	1230	7.0E-09	6.8E-07	1239	5.8E-07	5.4E-06	1247	1.4E-07	2.8E-06
18	0215	1.7E-08	8.3E-07	0226	9.3E-08	2.3E-06	0237	2.8E-08	1.5E-06
18	0622	3.1E-08	1.2E-06	0630	6.7E-08	2.0E-06	0639	3.1E-08	1.6E-06
18	1027	7.4E-09	7.4E-07	1036	2.4E-08	1.1E-06	1051	9.7E-09	9.2E-07

SOLAR X-RAYS BY SATELLITE

GOES

MAY 1978

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
18	1750	3.9E-09	5.0E-07	1848	2.8E-08	1.4E-06	1922	1.2E-08	9.5E-07
19	0812	3.2E-09	5.7E-07	0822	1.2E-07	2.5E-06	0827	3.4E-08	1.4E-06
19	1016	5.9E-09	7.6E-07	1019	2.6E-08	1.1E-06	1026	1.2E-08	9.0E-07
19	1027	1.4E-08	9.3E-07	1033	8.8E-08	2.0E-06	1038	2.2E-08	1.2E-06
19	1227	3.4E-08	1.1E-06	1230	4.9E-08	1.7E-06	1233	4.7E-08	1.4E-06
19	1851	2.8E-08	1.1E-06	1857	1.0E-07	2.2E-06	1903	3.8E-08	1.6E-06
20	0132	2.9E-08	1.1E-06	0139	1.5E-07	3.0E-06	0145	4.4E-08	1.9E-06
20	0228	8.0E-09	7.1E-07	0234	3.0E-07	3.4E-06	0239	6.3E-08	2.0E-06
20	1135	2.7E-08	1.3E-06	1138	5.0E-08	1.9E-06	1141	4.4E-08	1.5E-06
20	1454	8.3E-09	9.0E-07	1458	4.8E-08	1.4E-06	1500	1.6E-08	1.0E-06
20	1600	3.2E-08	1.2E-06	1603	5.1E-08	1.8E-06	1607	4.1E-08	1.5E-06
20	1804	2.1E-08	1.2E-06	1807	3.3E-08	1.9E-06	1809	3.1E-08	1.3E-06
20	1832	9.4E-08	1.6E-06	1848	2.8E-07	4.4E-06	1904	9.6E-08	2.9E-06
20	2238	3.3E-08	1.3E-06	2243	1.1E-07	2.2E-06	2249	4.1E-08	1.7E-06
21	0036	1.0E-08	8.8E-07	0040	5.1E-08	1.4E-06	0045	1.8E-08	1.1E-06
21	0430	5.1E-09	7.3E-07	0435	9.1E-08	2.0E-06	0443	3.3E-08	1.3E-06
21	0850	1.2E-08	8.8E-07	0853	4.2E-07	1.4E-06	0947	1.6E-08	1.1E-06
21	1003	3.0E-08	1.4E-06	1006	3.8E-08	2.0E-06	1008	3.4E-08	1.4E-06
21	1630	1.2E-08	1.0E-06	1633	4.1E-08	1.9E-06	1635	3.6E-08	1.3E-06
21	2044	1.7E-08	1.6E-06	2057	1.5E-07	3.9E-06	2115	5.7E-08	2.8E-06
21	2349	1.2E-08	1.1E-06	2352	5.0E-08	2.0E-06	0000	2.6E-08	1.5E-06
22	0201	7.5E-09	9.6E-07	0207	7.2E-07	7.7E-06	0211	1.1E-07	3.4E-06
22	0707	1.2E-08	1.0E-06	0716	1.5E-07	2.3E-06	0803	5.1E-08	1.7E-06
22	1431	2.3E-09	7.9E-07	1435	5.6E-08	2.0E-06	1439	2.4E-08	1.2E-06
22	1458	4.2E-09	8.5E-07	1542	1.4E-07	3.3E-06	1612	4.2E-08	2.0E-06
22	1622	1.4E-08	1.6E-06	1627	2.7E-07	4.5E-06	1630	8.3E-08	2.8E-06
22	1837	2.9E-08	1.4E-06	1843	9.9E-08	2.3E-06	1849	5.1E-08	1.8E-06
23	0105	4.9E-07	9.6E-06	0109	1.3E-06	1.9E-05	0122	9.5E-07	1.4E-05
23	0950	3.1E-08	1.3E-06	0953	4.2E-08	2.0E-06	1002	2.1E-08	1.6E-06
23	1518	2.5E-08	1.1E-06	1521	3.9E-08	1.7E-06	1523	3.8E-08	1.4E-06
23	1949	1.5E-08	9.3E-07	2004	1.2E-07	2.5E-06	2026	2.4E-08	1.7E-06
24	0523	2.8E-08	1.3E-06	0526	4.2E-08	2.0E-06	0538	2.1E-08	1.6E-06
24	1750	6.2E-09	7.4E-07	1802	4.9E-07	8.4E-06	1809	1.6E-07	4.3E-06
24	1906	5.0E-08	1.5E-06	1930	1.8E-06	1.5E-05	2004	3.7E-07	8.2E-06
24	2241	1.4E-08	1.0E-06	2248	9.4E-08	2.3E-06	2257	1.5E-08	1.6E-06
25	0332	1.2E-08	9.3E-07	0342	1.5E-07	3.0E-06	0351	4.1E-08	1.9E-06
25	0537	9.5E-09	8.2E-07	0554	1.7E-07	3.3E-06	0650	2.3E-08	1.5E-06
25	0933	6.0E-08	8.3E-07	0941	4.4E-08	1.4E-06	0951	1.5E-08	1.1E-06
25	2251	7.8E-09	7.7E-07	2254	3.5E-08	1.2E-06	2257	1.3E-08	9.8E-07
26	0040	2.8E-08	1.2E-06	0053	1.2E-07	2.8E-06	0115	3.0E-08	2.0E-06
26	1649	2.0E-08	1.3E-06	1657	5.5E-08	2.0E-06	1702	3.1E-08	1.6E-06
26	1744	3.6E-09	1.1E-06	1751	6.3E-06	3.8E-05	1756	2.2E-06	1.9E-05
27	0059	5.9E-09	7.0E-07	0105	4.4E-08	1.4E-06	0136	1.8E-08	1.0E-06
27	0318	6.0E-08	7.6E-07	0323	9.1E-08	1.7E-06	0330	3.5E-08	1.2E-06
27	0808	1.1E-08	7.5E-07	0814	6.1E-07	5.5E-06	0818	1.2E-07	2.9E-06
27	0922	1.1E-08	8.2E-07	0925	7.3E-08	1.8E-06	0929	4.1E-08	1.3E-06
27	0937	1.5E-08	9.6E-07	0940	6.1E-08	1.8E-06	0944	4.5E-08	1.3E-06
**	****	3.3E+20	1.9E-78	0000	1.1E+00	2.7E-41	0000	0.0E+00	1.4E+51
27	1146	7.3E-09	7.3E-07	1149	4.3E-08	1.1E-06	1151	2.0E-08	9.2E-07
27	1206	1.3E-08	7.8E-07	1212	5.4E-08	1.5E-06	1224	2.9E-08	1.1E-06
27	1617	2.3E-08	9.0E-07	1627	3.6E-07	4.4E-06	1637	6.4E-08	2.6E-06

SOLAR X-RAYS BY SATELLITE

GOES

MAY 1978

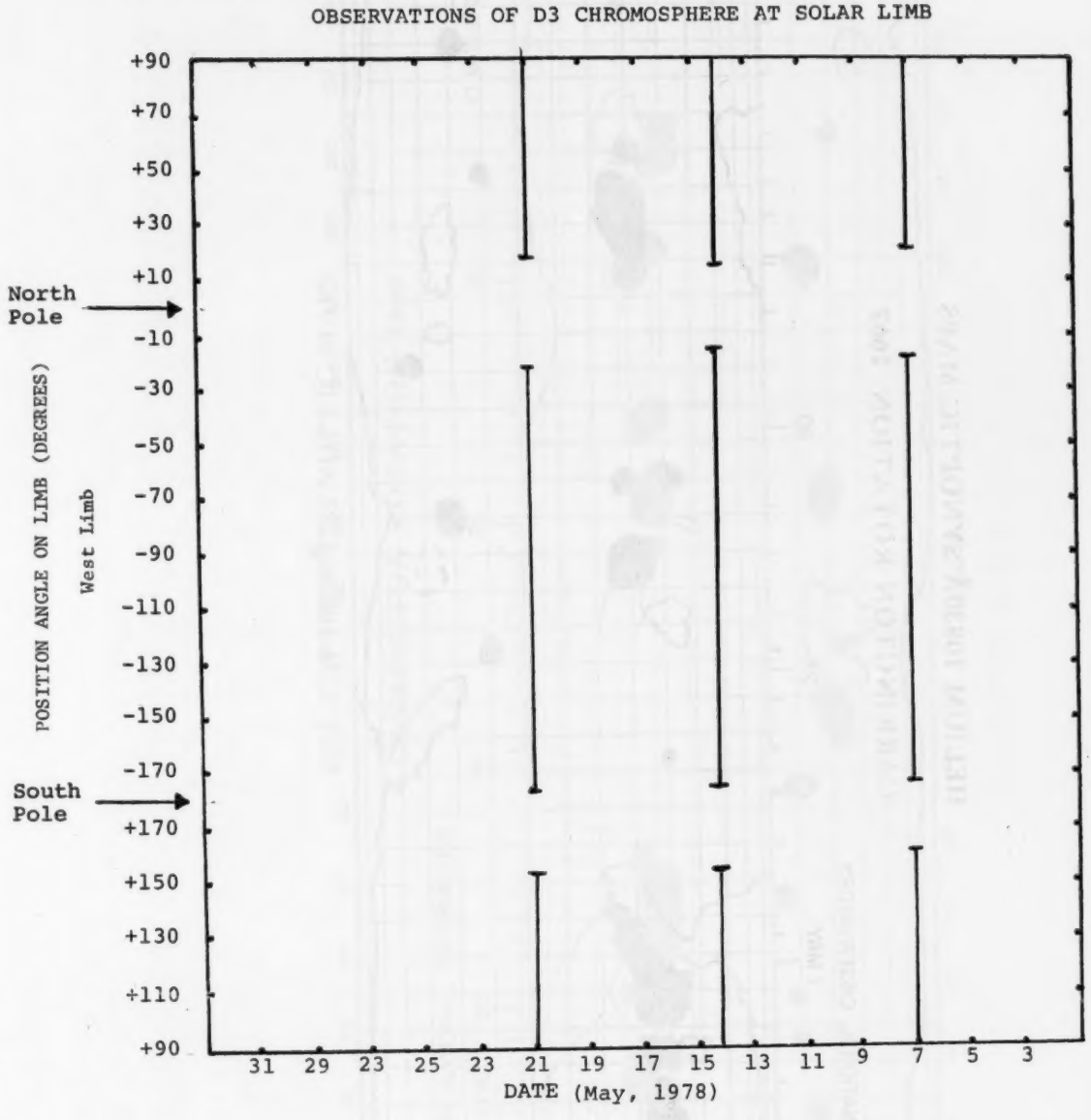
DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
27	1729	2.0E-08	9.2E-07	1735	5.8E-08	1.8E-06	1738	3.8E-08	1.2E-06
27	2029	1.2E-08	7.3E-07	2032	2.5E-06	1.3E-06	2034	9.5E-09	7.3E-07
27	2247	7.4E-09	7.2E-07	2320	4.2E-08	1.4E-06	2334	1.7E-08	1.0E-06
28	0333	3.0E-08	8.5E-07	0337	6.8E-08	1.3E-06	0342	1.9E-08	1.0E-06
28	0714	3.9E-08	7.6E-07	0732	7.5E-07	6.8E-06	0740	1.8E-07	3.5E-06
28	0821	2.8E-08	1.1E-06	0824	9.1E-08	2.3E-06	0826	3.3E-08	1.5E-06
28	1023	3.4E-08	1.4E-06	1026	5.0E-08	2.0E-06	1031	6.0E-08	1.7E-06
28	1038	7.8E-08	1.8E-06	1046	9.4E-07	7.6E-06	1054	2.5E-07	4.6E-06
28	1311	3.0E-08	9.8E-07	1340	1.5E-06	1.2E-05	1401	4.8E-07	6.3E-06
28	1456	2.2E-07	3.6E-06	1502	3.0E-05	1.2E-04	1507	9.3E-06	5.9E-05
28	1710	2.9E-08	1.2E-06	1713	3.7E-08	2.0E-06	1717	4.8E-08	1.6E-06
28	1958	1.7E-08	9.9E-07	2006	2.1E-07	3.2E-06	2011	4.4E-08	1.9E-06
28	2033	4.0E-08	1.2E-06	2038	2.0E-07	2.7E-06	2043	4.1E-08	1.7E-06
29	0014	2.3E-08	1.0E-06	0017	6.2E-08	2.2E-06	0022	4.0E-08	1.6E-06
29	0124	3.5E-08	1.2E-06	0127	7.1E-08	2.0E-06	0136	4.2E-08	1.6E-06
29	0655	1.1E-08	8.9E-07	0658	6.9E-08	1.8E-06	0705	3.8E-08	1.3E-06
29	1018	7.9E-09	8.4E-07	1023	5.2E-08	1.7E-06	1029	1.9E-08	1.2E-06
29	1510	2.0E-08	1.0E-06	1519	1.1E-07	2.5E-06	1530	2.0E-08	1.7E-06
29	1717	9.3E-09	8.4E-07	1720	6.1E-08	1.3E-06	1723	1.9E-08	1.0E-06
29	1957	1.1E-08	8.8E-07	2001	6.5E-08	1.9E-06	2003	3.3E-08	1.2E-06
29	2140	3.8E-08	1.3E-06	2147	1.8E-07	2.6E-06	2157	7.5E-08	1.9E-06
29	2313	1.5E-08	1.0E-06	2316	6.7E-08	1.8E-06	2319	2.2E-08	1.2E-06
30	0350	1.2E-08	7.3E-07	0354	3.4E-08	1.1E-06	0400	8.0E-09	9.0E-07
30	0405	1.1E-08	8.9E-07	0416	1.1E-07	2.4E-06	0430	2.8E-08	1.6E-06
30	0547	2.6E-08	1.1E-06	0618	9.2E-07	8.7E-06	0706	1.6E-07	4.9E-06
30	0712	1.5E-07	4.2E-06	0725	8.7E-06	5.4E-05	0737	2.5E-06	2.7E-05
30	0957	1.7E-08	1.2E-06	1006	2.2E-07	3.8E-06	1011	5.6E-08	2.2E-06
30	1128	3.5E-08	1.2E-06	1146	8.0E-08	2.0E-06	1205	5.3E-08	1.6E-06
30	1306	1.3E-08	1.2E-06	1310	4.5E-08	1.9E-06	1314	2.4E-08	1.5E-06
30	1516	1.4E-08	1.0E-06	1531	1.2E-06	1.0E-05	1538	2.2E-07	5.4E-06
31	0024	6.5E-09	9.1E-07	0027	5.0E-08	1.4E-06	0029	1.3E-08	1.0E-06
31	0156	6.4E-09	9.2E-07	0206	6.0E-08	1.9E-06	0212	3.5E-08	1.3E-06
31	0732	1.2E-08	7.7E-07	0736	6.7E-07	5.6E-06	0740	1.3E-07	2.9E-06
31	1009	3.6E-08	1.3E-06	1104	6.4E-06	5.7E-05	1229	1.7E-06	2.9E-05

CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

MAY 1978

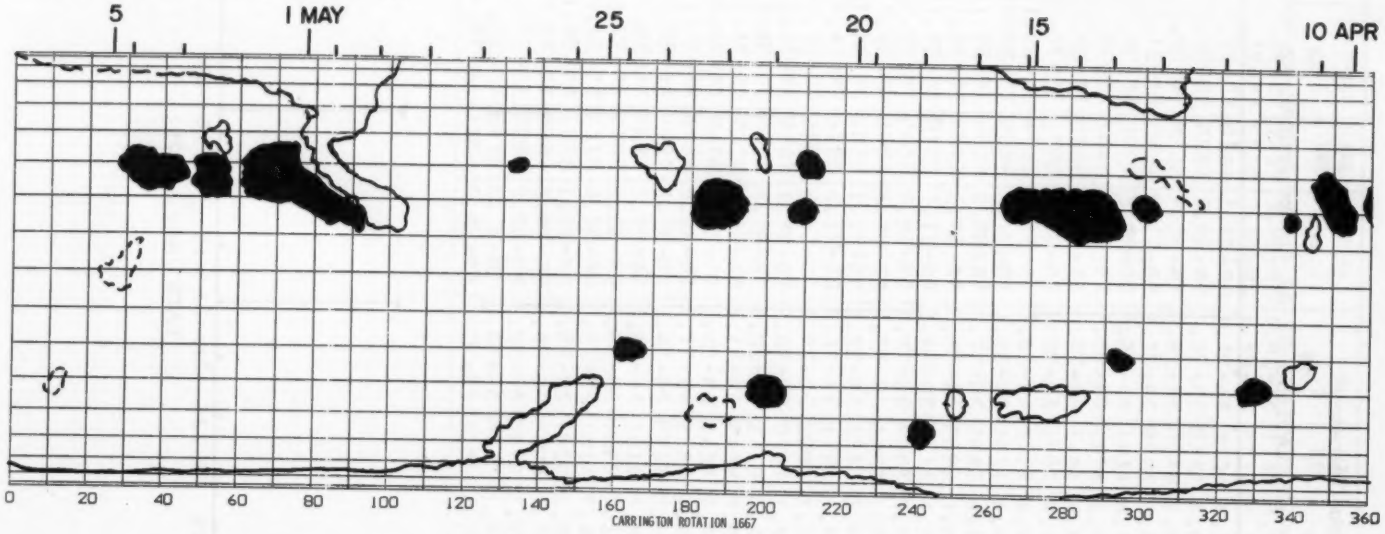
Big Bear Solar Observatory



HELIUM 10830Å SYNOPTIC MAPS

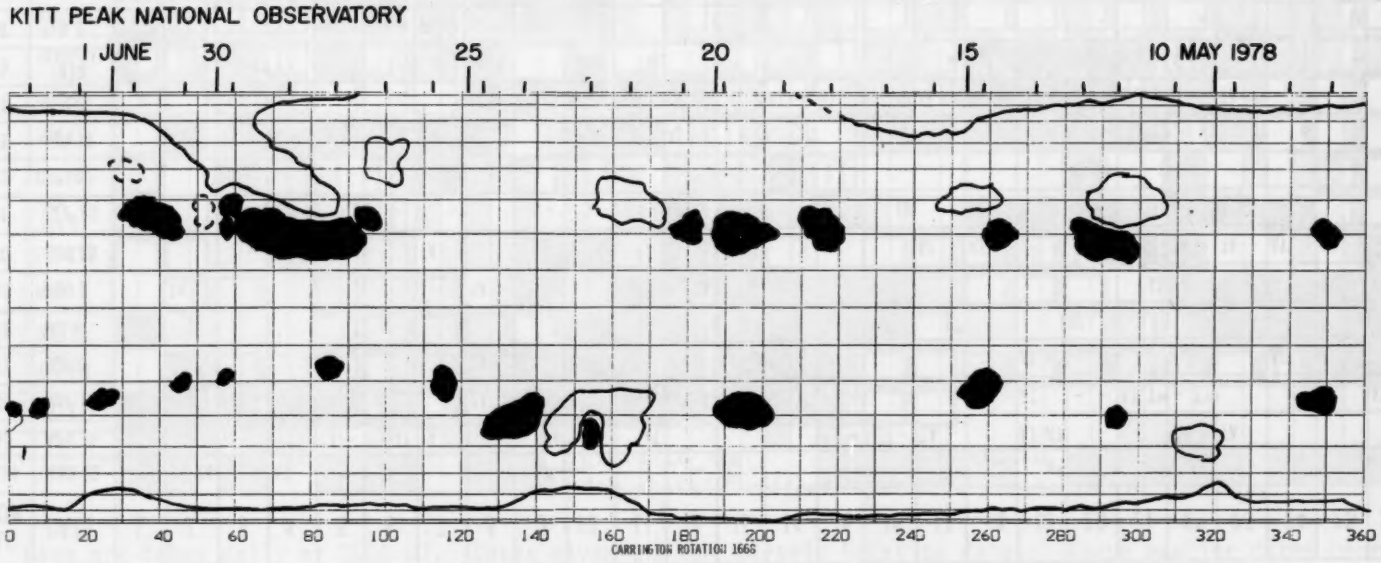
CARRINGTON ROTATION 1667

KITT PEAK NATIONAL OBSERVATORY



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1668



INFERRED IP MAGNETIC FIELD

BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1964	MAR 20		TA		AT					*			-	-						A*				-			
1965	APR 16			TA		TA	-	AT	TA		TA		AT			-	-	TA		AT	AT			TA				AT
1966	MAY 13	TA	-	-		TA			TA											AT	-	-	AT	T*	-	T*				AT	AT	-
1967	JUN 9								TA		-			TA						AT	A*						AT	*		A*		TA	TA
1968	JUL 6										A*			T*	TA	TA		T*			AT					-	AT			-		
1969	AUG 2		TA						TA	-			TA	*									ATA									
1970	AUG 29			-		-		TA										AT	AT			AT		TA		TA	-	AT		AT				
1971	SEP 25						-		-		-		-				TA				TA												
1972	OCT 22					-	AT														AT	AT				*						
1973	NOV 18			TA	AT						-		AT							*			*		*						
1974	DEC 15				-	-		-	AT	-		AT			AT	AT		AT		TA		TA		TA				*				
1975	1978 JAN 11		*	*						*		*						*			TA		-	AT			-				-
1976	FEB 7						*	TA				-			-						-			*			TA		A*	TA	
1977	MAR 6	TA		-					AT			T*	*					TA			AT	AT		AT		AT		*	TA				
1978	APR 2							*		-	AT											AT	AT										
1979	APR 29		TA		*		TA	AT	AT	TA		-	-	T*						TA	TA			AT									
1980	MAY 26				TA			AT																									

▒ = definitely towards the sun ▯ = definitely away from the sun

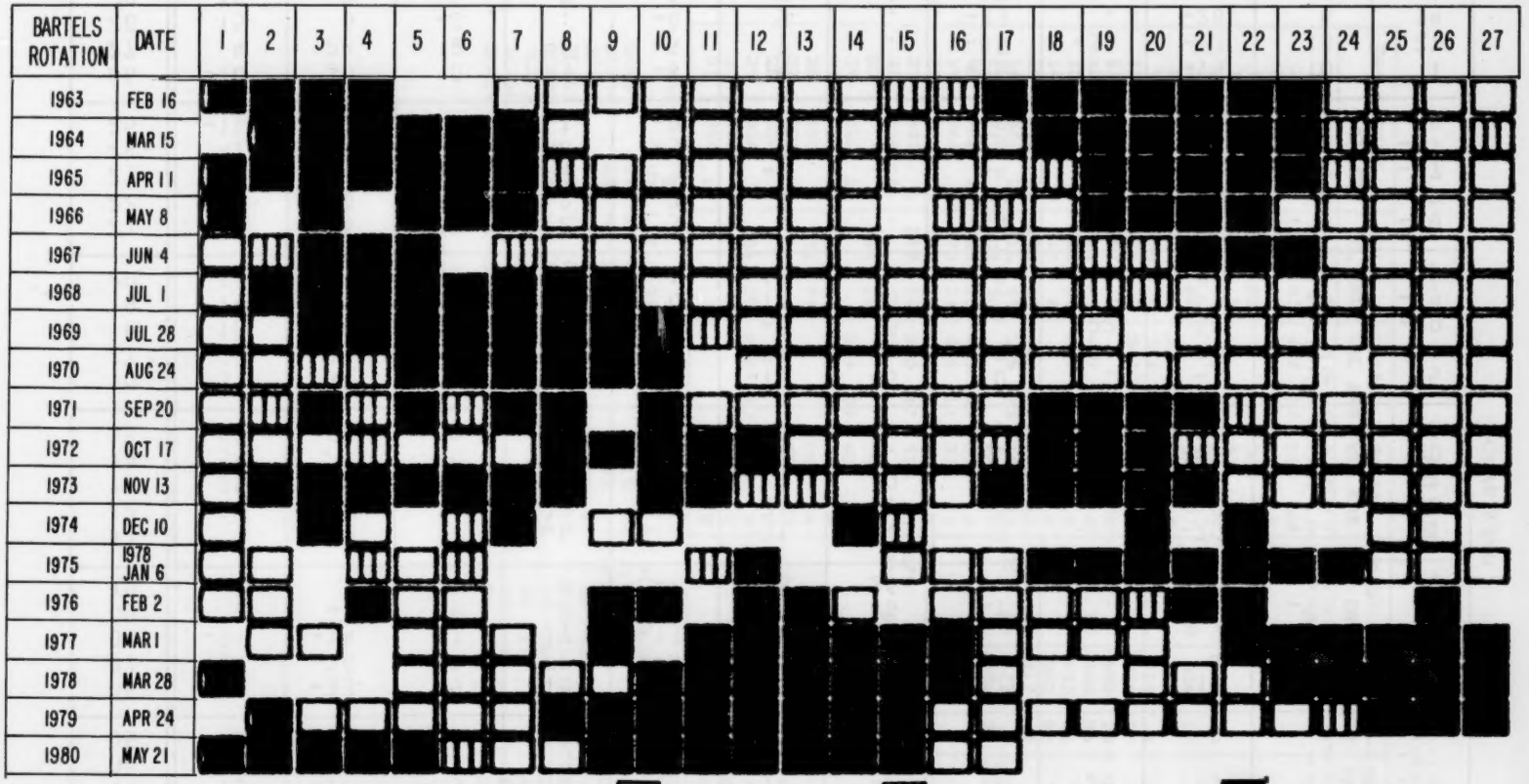
T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.

Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT. Dates given are not Bartels Rotation dates. These earlier dates correspond to the occurrence of phenomena on the sun which affect the Earth during the given Bartels Rotation.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

	1977							1978				
DAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY
01	13	2	-16	-9	9	6	-14	.	16	.	52	-12
02	15	-12	-23	-13	6	1	-10	.	31	22	46	-34
03	15	-18	-25	.	3	-14	-7	14	26	12	43	-27
04	13	-26	-23	3	13	-16	8	31	.	.	13	-27
05	0	-31	-16	12	13	-11	26	.	-5	8	4	-29
06	-19	-33	-5	18	11	-1	46	27	4	11	-15	-27
07	-32	-26	-1	22	-6	11	55	15	9	4	-32	-23
08	-31	-14	11	17	-13	31	53	.	.	.	-53	-12
09	.	-7	25	8	-13	46	46	-1	.	-31	-52	3
10	0	3	20	4	-4	48	26	11	-28	.	-41	24
11	7	20	17	6	2	51	.	0	-43	-70	-32	41
12	17	29	12	13	12	32	-2	.	.	-78	-4	50
13	28	30	11	19	28	14	10	.	-41	-56	22	47
14	38	24	5	23	35	-4	.	.	-23	-49	.	30
15	40	26	7	40	46	-10	1	.	3	-28	.	16
16	31	18	.	.	39	-18	-6	0	.	-3	58	5
17	24	13	5	38	20	-24	.	-3	31	18	37	1
18	18	4	13	41	6	-5	6	.	22	54	11	-29
19	19	1	19	31	6	-11	8	.	37	48	-9	-49
20	16	-1	23	17	1	-12	.	18	22	24	-30	-75
21	10	6	24	2	3	.	.	39	-1	.	-49	-79
22	2	9	22	-3	7	-7	.	10	-18	-23	-50	-59
23	-2	22	18	-2	3	-4	-5	-4	-49	-49	-62	-37
24	-7	25	8	-6	-3	0	-1	-15	.	-69	.	-21
25	-15	31	4	-1	-9	2	.	-17	.	-79	-13	-9
26	-10	30	0	-3	-5	4	.	-36	.	-73	10	1
27	4	24	2	-8	-5	7	.	-48	-34	-53	13	27
28	15	6	-2	.	-6	5	.	-33	.	-28	6	14
29	19	4	-6	-8	5	-2	-9	-15		.	13	-10
30	14	-4	-6	3	6	-11	.	14		.	18	-20
31		-10	-11		8		-20	10		.		-27

Dot symbol entry indicates no data available for the day.

SOLAR WIND

Interplanetary Scintillations

MAY 1978

DAY	3C48 VEL	ERR	3C144 VEL	ERR	3C147 VEL	ERR	3C161 VEL	ERR	3C237 VEL	ERR	3C273 VEL	ERR	3C298 VEL	ERR	3C459 VEL	ERR
1			690	54			771	17	529	37						
2			778	15	467	57	515	38								
3							640	9								
4			624	25			382	6							461	63
5	499	9	426	9			476	17								
6	590	6	389	9	379	58	422	8								
7	621	25	396	62			431	67	494	18	504	11				
8	397	4	310	12	337	45	430	5			540	20				
9	516	12	323	8	214	4	446	15			519	3			572	48
10	408	5	441	7	342	67	516	11			786	32			525	9
11	536	34	357	8			398	38			490	13			459	9
12	450	4	450	11	407	23	408	6	351	70	448	80			461	6
13	352	5	383	16	371	24	361	6			455	48			516	60
14	483	6	345	8			356	6			380	92			371	4
15	515	18	398	61	441	69	273	45	327	42	417	3			356	5
16	508	26	416	19	355	23	352	24	307	64	379	4			360	40
17	415	6	405	10			234	7			381	39				
18	488	18	353	10	405	10	394	14								
19	368	4	375	11	464	11	376	11			335	6			437	45
20	386	7	337	6			395	18							402	52
21	442	6	299	12	300	47	413	28	275	3	349	20			416	12
22	515	15							355	30	390	3			311	5
23			384	16			598	14								
24	523	10			354	29	486	21			509	11				
25	503	9	487	24	386	71	472	9			538	121				
26	402	6	552	91			387	14								
27	281	6					491	33								
28	336	6					361	7	223	16					384	85
29	336	6	554	113	338	40	384	5	275	18	312	19			267	16
30	317	5					455	8			397	4	385	16	334	4
31	354	11					516	18			411	9	426	5	340	16

MAY	5				15				25			
	UT	LAT	DIST	DLON	UT	LAT	DIST	DLON	UT	LAT	DIST	DLON
3C48	19.	57.	0.40	33.	18.	44.	0.49	44.	18.	33.	0.59	43.
3C144	23.	-8.	0.62	-52.	22.	-9.	0.48	-61.	22.	-10.	0.33	-71.
3C147	22.	17.	0.74	-37.	21.	25.	0.65	-43.	21.	35.	0.56	-45.
3C161	0.	-24.	0.84	-26.	24.	-30.	0.76	-31.	23.	-37.	0.68	-34.
3C237	4.	-6.	1.12	-15.	3.	-5.	1.07	-16.	2.	-4.	1.03	-17.
3C273	6.	-3.	1.25	-9.	5.	-2.	1.22	-11.	4.	-1.	1.18	-13.
3C298	8.	0.	1.28	-4.	7.	1.	1.27	-6.	6.	2.	1.25	-8.
3C459	16.	6.	0.81	34.	16.	4.	0.90	25.	15.	3.	0.96	17.

Dot symbol entry indicates no data available for the day.

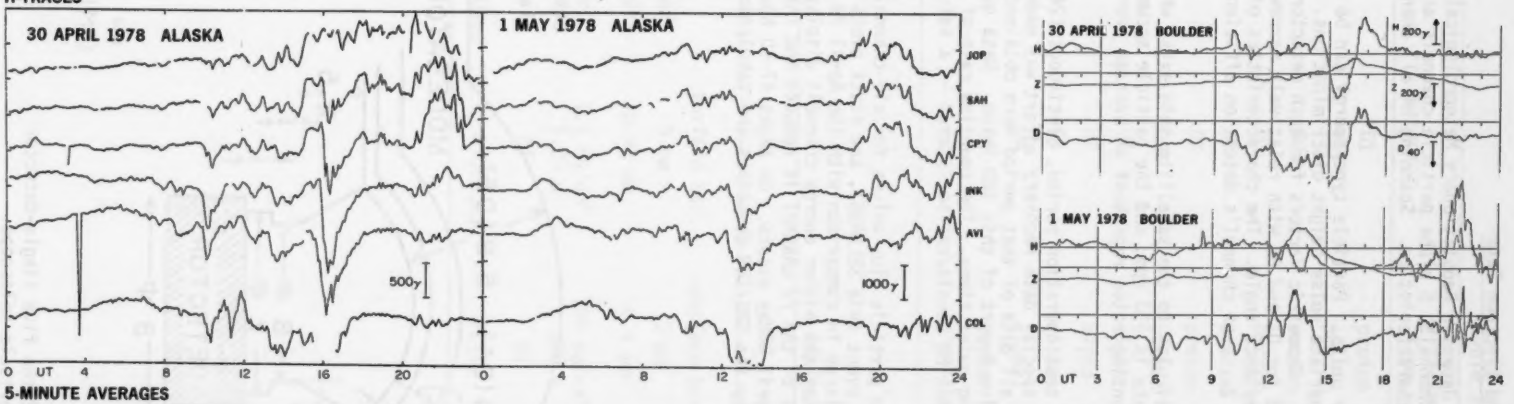
BOULDER GEOMAGNETIC SUBSTORM LOG

MAY 1978

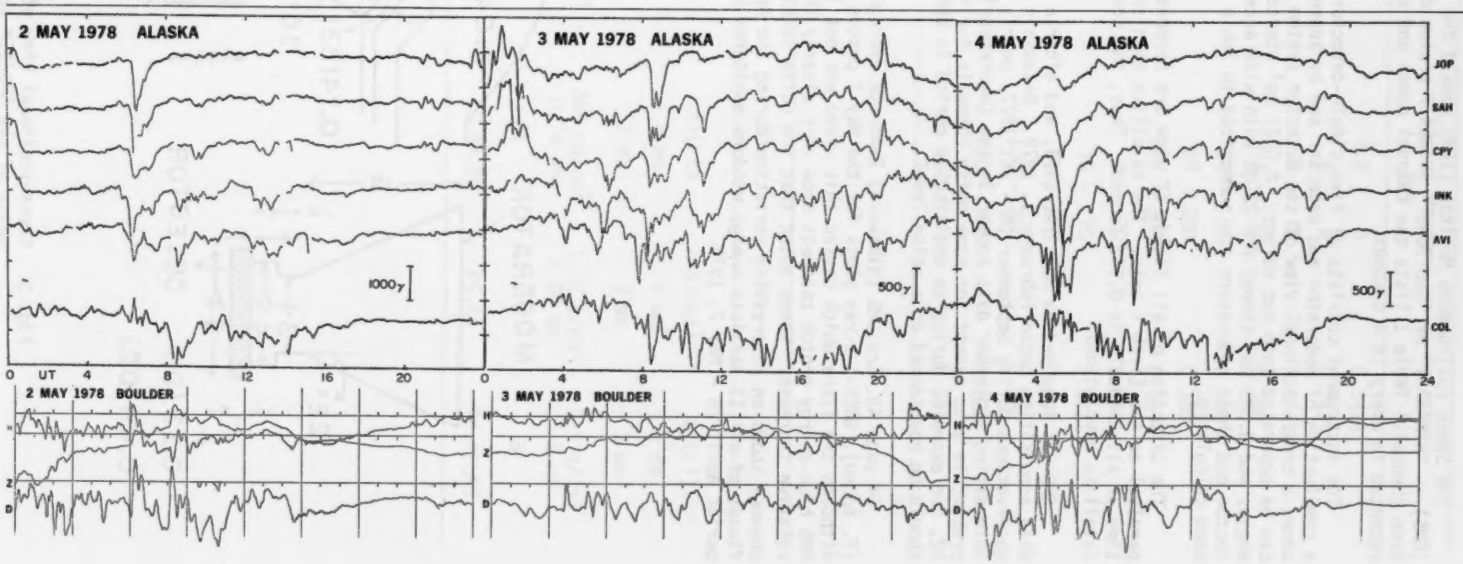
DATE	TIME OF ONSET	DIRECTION	COMMENTS
1	0230		Gradual onset of mag storm
	1205		Very intense; 140 gamma minus Z component at Boulder
	2110		Very intense; 235 gamma plus H component at Boulder 210 gamma plus Z component at Boulder
2			Mag storm continues through 1600 UT
	2310		Ssc
3			Mag storm
4			Mag storm continues through 2000 UT
5	2010		Boulder daylight; H component only at midlatitudes
	2100		Boulder daylight; H component only at midlatitudes
6			Unsettled; no distinct onsets
7	0440	East	Weak
	0540	East	
	0850	West	Weak
	1545		Boulder daylight
	1830		" "
8	1100	West	
			Midlatitude and stations north of auroral oval strongly unsettled in daylight, oval stations quiet 08/1640 UT to 09/0050 UT.
9	0050		Gradual onset of magstorm lasting through 09/1800 UT. Intense global SS detected over entire network; propagation time between Hudson Bay and Alaska of 15 minutes.
	0955		" " "
10	2005		Network in daylight; excursions most notable midlatitude and north of oval.
	2140		" " "
	2250		" " "
	2320		" " "
11	0150	East	
	0255	East	
	0345	East	
	0515	West	
	0545	West	
	0820	West	
	0940	West	
12	0045	East	1st of double onset SS-weak
	0110	East	2nd of double onset SS
	0245	East	
	0440	East	
	0540	East	
	0730	West	
	0820	West	
	1205		Boulder daylight
	1245		Boulder daylight - SS propagated slowly northward through network stations north of oval.
13	0035	East	
14	0155	East	Weak
	0940	West	Weak
			Midlatitude and stations north of auroral oval unsettled in daylight, oval stations quiet 1800-2300 UT.
15	2035		Weak - network in daylight
			Unsettled conditions for network, 1010-2220 UT
16	1250		Weak - onset of unsettled conditions lasting through 2300 UT
	1745		Boulder daylight
17	0405		Slow increase in H-component only at Boulder and oval stations west of Boulder
	0550	East	
	1010	West	Weak
18	0335	East	Most evident on Ft. Churchill chain
	0940	West	Weak
	1550		Network in daylight, response evident from Norman Wells through Alaska Chain
19			Network unsettled 0800-1600 UT No distinct onsets.
20	1710		Network in daylight, response evident at Pelly Bay and Arctic Village northward
	1955		Network in daylight, response evident at Eskimo Pt. northward and Cape Parry northward. Midlatitude and oval stations show only minor pertubations.
21	0245		H-component response only, mid and low latitude
	0545		" " " "
	1830		Network in daylight, 1st of multiple onset
	1915		" " 2nd " "
	1935		" " 3rd " "
	1950		" " 4th " "
	2100		" " 5th " "
	2250		" "
22	0350	East	SS evident at Lynn Lake, Back, Island Lake, Tucson and Boulder only
	0940	West	1st onset, College and Talkeetna only
	1020	West	2nd onset, College, Arctic Village and Talkeetna only
	1145	West	1st onset, College, Arctic Village and Talkeetna only
	1230	West	2nd onset, Lynn Lake westward through Alaska as far north as Inuvik
	1350		Onset of multiple onset ss period lasting through 2100 UT. Activity from Back-Lynn Lake Westward through Alaska along oval
23	0600	Near center	"
	1105	West	
	1610		Network in daylight
	2005		Sharp impulse observed throughout network including low latitude stations. Marks onset of unsettled field conditions
24			Generally unsettled throughout the day
	0730	West	1st of multiple onset
	0815	West	2nd of multiple onset, H-component response moderate at Honolulu, Midway and Tahiti
	0910	West	3rd of multiple onset
	0950	West	4th of multiple onset
	1140	West	1st of multiple onset, moderately strong along oval
	1215	West	2nd of multiple onset, moderately strong along oval
	1250	West	3rd of multiple onset, moderately strong along oval
	1340	West	4th of multiple onset, moderately strong along oval
	2340	East	
25	0035	East	Weak activity
	0225	East	" "
	0730	West	" "
	1255	West	" "
	2030		Beginning of unsettled conditions in network except oval stations quiet
26	0100	East	1st of double onset
	0145	East	2nd of double onset
	0535	Near center	
	0945	West	1st of multiple onset
	1020	West	2nd of multiple onset
	1110	West	3rd of multiple onset
27	0400	East	Weak ss
	0615	Near center	
	0920	West	SS seen at oval stations only
28	0910	West	1st of double onset
	0945	West	2nd of double onset
29	1825		Marked increase in H-component only at mid and low latitude stations. Pelly Bay, Sachs Harbour and Cape Parry stations become moderately disturbed
	2215		Network in daylight
30	0020	East	1st of double onset
	0050	East	2nd of double onset
	0635	West	1st of multiple onset
	0700	West	2nd of multiple onset
	0730	West	3rd of multiple onset
31	0140	East	Most distinct at mid and low latitude stations. Oval center between Inuvik and Cape Parry and between Norman Wells and Fort Simpson
	0345	East	1st of double onset - weak
	0430	East	2nd of double onset
	0720	West	Weak ss
	1150	West	Weak ss

GEOMAGNETIC ACTIVITY FOR STORMS 30 APRIL TO 4 MAY 1978

H-TRACES



5-MINUTE AVERAGES



GMS/SEM Proton, Alpha and Electron Data

The Space Environment Monitor (SEM) aboard the Japanese Geostationary Meteorological Satellite (GMS) -- "HIMAWARI" or "Sunflower" -- has 7 proton channels, 5 alpha particle channels and one electron channel. Table 1 lists the channel names and characteristics. Scanning of all channels is repeated in every 16.4 seconds.

The instrument consists of five single-detector units. Particle type/energy can be observed by a combination of moderator and detector and by appropriate pulse height discriminations. Figure 1 shows a cross-sectional view of the detector system. Geometric factors for each detector (D1-D5) can be separated into two values: 0.0421 $cm^2 \cdot$sterad for D1 and D2 with relatively narrow acceptance angle; and 0.389 $cm^2 \cdot$sterad for D3-D5 with wide acceptance angle. The characteristics of each detector and their moderators are summarized in Table 2. Each channel's detection efficiency has been calculated.

The direction of all fields of view are perpendicular to the satellite spin axis, which is parallel to the Earth's axis. The satellite spin rate is 100 rpm, and the particle accumulation time of all channels is 0.992 second. Thus, the counting rates represent an average over 1.68 satellite revolutions.

GMS was launched on July 14, 1977, and after a test operation period, continuous (24 hour a day) data acquisition began February 5, 1978. Because a special data recovery effort was made for the observations during September 18 - 26, 1977, nearly all data of that period were obtained. Some interesting September data appear in the Comprehensive Report of this SGD issue. Data quality at present is good except for some noisy channels during quiet times. The counting rate of channel P2, for example, during an undisturbed period is about 80 counts/$cm^2 \cdot$sec$\cdot$sterad -- a value that should be considered as a noise level.

On page 46, are GMS (Himawari) 2-minute average particle flux values for all channels (T. Kohno), GOES-1 x-ray plots for the May 7 proton event (via SELDADS), and stack plots for May 9. Although the flare which caused this event was not large in comparison with the April 28 flare, GMS high-energy proton channels show very clearly that the higher energy channels display a greater relative increase. Kohno noted that the noise level of the P2 channel is reduced and that this channel shows an interesting variation during the April - May events. On pages 47-50 hourly average fluxes of all 13 particle energy windows monitored by the GMS/SEM detectors are tabulated for the period April 28 - May 7, 1978.

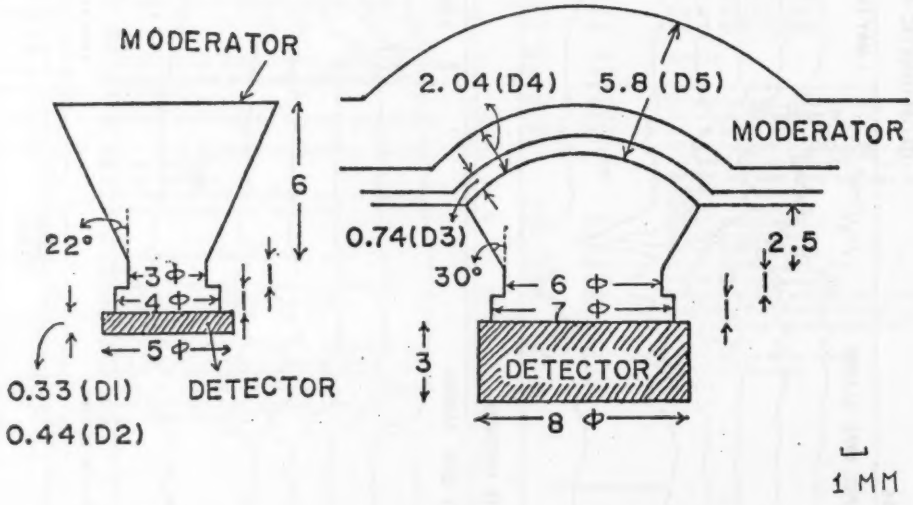


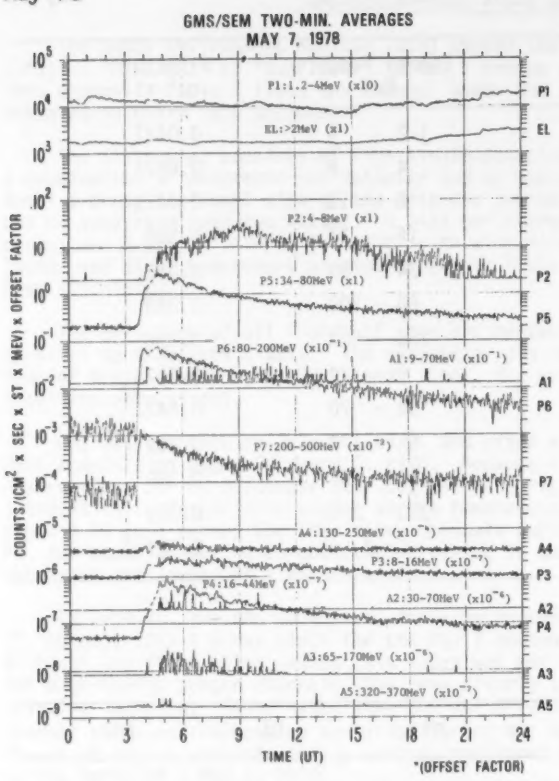
Fig. 1. Cross-sectional view of the five single-detector units of the GMS/SEM particle telescope.

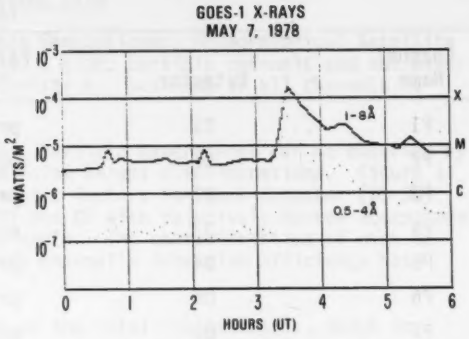
Table 1

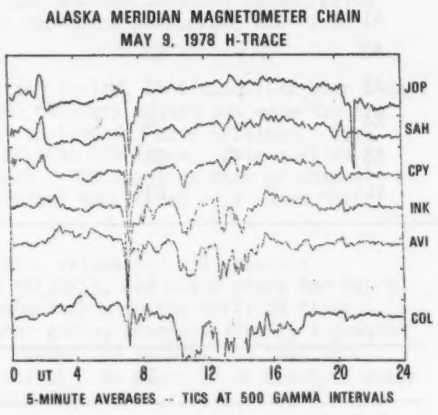
Channel Name	Detector	Particle Type	Energy Range MeV	G-factor $cm^2 \cdot st$
P1	D1	proton	1.2 - 4	0.0421
P2	D1	proton	4 - 8	0.0421
P3	D2	proton	8 - 16	0.0421
P4	D3	proton	16 - 34	0.389
P5	D4	proton	34 - 80	0.389
P6	D5	proton	80 - 200	0.389
P7	D5	proton	200 - 500	0.389
A1	D1	alpha	9 - 70	0.0421
A2	D2	alpha	30 - 70	0.0421
A3	D3	alpha	65 - 170	0.389
A4	D4	alpha	130 - 250	0.389
A5	D5	alpha	320 - 370	0.389
EL	D3	electron	> 2	0.389

Table 2

	D1	D2	D3	D4	D5
Detector Type	surface bar.	surface bar.	Si(Li)	Si(Li)	Si(Li)
Diameter	5 mm	5 mm	8 mm	8 mm	8 mm
Thickness	0.33 mm	0.4 mm	3 mm	3 mm	3 mm
Moderator Thickness	1.1 mg/cm^2 1.25 μ	106 mg/cm^2 120 μ	200 mg/cm^2 0.74 mm	1.71 g/cm^2 2.04 mm	9.9 g/cm^2 5.8 mm
Material	Ni	Ni	Al	Cu	W
Channel Used	P1,P2,A1	P3,A2	P4,A3,EL	P5,A4	P6,P7,A5







Errata: Several errors appeared in the information about the *IMS North American Magnatometer Network* given in the May 1978 issue of SGD, No. 405 Part I, page 39.

a.) Some satellite telemetry relay data from the network exist for the period July 1977 - January 1978. February 1978 data are not the first received at the Space Environment Laboratory.

b.) "Van Sabben 3-letter code" should read "International 3-letter code."

c.) Because the International 3-letter codes were not used in the first data set we received, NGSDC wrongly deciphered 3 station names. Please make the following changes in the station list:

"Cape Prince Alfred	CPA"	should read	"Cape Parry	CPY"
"Baker Lake	BLC"	should read	"Back	BKC"
"Norway House	NHO"	should read	"Norman Wells	NOW".

c.) Eusebio is in Brazil and San Juan is in Puerto Rico. Data from all the stations are not currently received at Boulder because either all the equipment is not yet installed or some portion of the installed equipment has failed. Although substorm activity can be variable throughout the network, the full array is being used for analysis of activity. The description of the activity (and its variability) will become more specific in the comment portion of the Substorm Log.

********** SEM HOURLY AVERAGE DATA **********

COUNTS/(CM2*SEC*STERAD)

1978. 4.28. (118)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	3877.9	19.03	94.85	11.01	11.01	4.28	2.48	5.49	1.78	0.35	4.85	0.46	3445.3	168
1 - 2	3070.2	9.53	81.48	9.83	9.43	2.05	1.43	0.55	0.22	0.16	4.27	0.06	2673.1	216
2 - 3	2690.8	12.72	82.84	9.98	9.64	1.98	1.55	1.50	0.21	0.16	4.35	0.09	2641.6	224
3 - 4	1473.9	11.31	82.14	9.91	9.38	2.18	1.62	0.78	0.44	0.08	4.36	0.04	1420.4	216
4 - 5	1085.0	7.87	81.59	9.95	9.51	2.20	1.43	0.78	0.11	0.05	4.38	0.05	1031.2	216
5 - 6	946.5	6.84	81.67	9.68	9.27	1.92	1.28	1.07	0.32	0.03	4.35	0.06	896.3	224
6 - 7	906.3	5.65	80.70	9.57	9.35	1.85	1.73	0.22	0.11	0.05	4.32	0.10	868.7	216
7 - 8	789.0	4.81	82.31	9.54	9.37	1.82	1.42	0.75	0.11	0.05	4.40	0.01	793.9	224
8 - 9	716.9	7.32	80.70	9.47	9.96	1.88	1.57	0.78	0.11	0.07	4.31	0.03	615.7	216
9 - 10	918.8	5.02	81.03	9.44	9.21	1.94	1.45	0.43	0.0	0.05	4.33	0.07	693.4	224
10 - 11	818.3	4.99	80.92	9.49	9.36	2.09	1.42	0.33	0.0	0.02	4.38	0.10	650.2	216
11 - 12	654.1	6.09	80.81	9.53	9.31	1.90	1.43	0.75	0.21	0.02	4.38	0.05	562.0	224
12 - 13	702.7	8.98	80.59	9.57	9.19	1.98	1.55	0.33	0.22	0.05	4.32	0.05	591.6	216
13 - 14	981.4	6.03	81.13	9.36	9.31	1.90	1.39	0.53	0.11	0.08	4.32	0.10	890.1	224
14 - 15	997.0	3.55	80.04	9.48	9.48	2.03	1.36	0.22	0.11	0.04	4.33	0.02	897.0	216
15 - 16	1049.7	3.10	81.13	10.10	9.85	2.82	1.63	0.53	0.0	0.03	4.30	0.10	935.6	224
16 - 17	1055.6	2.99	85.36	12.21	10.78	3.29	2.22	0.55	0.0	0.05	4.42	0.08	943.3	216
17 - 18	975.0	8.02	86.37	14.09	11.83	4.47	2.48	0.21	0.11	0.08	4.42	0.06	852.7	224
18 - 19	966.6	10.53	93.23	16.32	12.90	5.43	3.07	0.78	0.22	0.11	4.43	0.12	835.8	216
19 - 20	989.9	33.92	108.25	20.83	14.10	7.11	3.50	1.55	0.67	0.22	4.39	0.13	889.4	216
20 - 21	1350.3	44.04	114.70	23.65	15.29	7.84	3.82	1.82	1.07	0.23	4.47	0.15	1215.8	224
21 - 22	1765.7	26.27	107.20	24.31	16.39	9.19	4.43	1.33	1.22	0.31	4.43	0.10	1595.6	216
22 - 23	1794.8	34.31	119.30	27.26	17.66	10.31	4.64	2.57	0.64	0.30	4.48	0.12	1103.2	224
23 - 24	1901.2	82.03	141.62	30.35	18.72	11.10	4.31	4.32	1.44	0.47	4.43	0.19	1271.4	216

********** SEM HOURLY AVERAGE DATA **********

COUNTS/(CM2*SEC*STERAD)

1978. 4.29. (119)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	2082.0	82.81	136.18	32.49	19.65	11.78	4.72	3.42	1.00	0.37	4.43	0.11	1349.5	168
1 - 2	2311.1	60.69	127.48	30.10	20.22	11.59	4.91	3.21	1.33	0.59	4.49	0.17	1248.9	216
2 - 3	2318.8	63.87	136.38	34.33	20.95	12.16	4.84	3.63	2.24	0.52	4.48	0.15	1302.2	224
3 - 4	2172.3	62.41	145.50	40.46	22.75	12.23	4.95	5.10	2.77	0.64	4.50	0.16	1234.7	216
4 - 5	2145.3	75.40	156.21	49.70	24.83	12.93	4.44	5.42	3.42	0.71	4.47	0.15	1225.8	84
5 - 6	1912.1	74.76	159.85	53.45	28.24	12.71	5.05	8.54	4.95	0.96	4.47	0.09	1014.1	213
6 - 7	1941.4	58.10	135.36	46.80	26.75	13.21	4.70	6.41	4.28	0.86	4.59	0.13	908.5	224
7 - 8	1933.7	68.84	168.00	60.32	28.59	12.83	4.55	6.98	4.66	1.04	4.62	0.14	963.7	216
8 - 9	1744.7	96.74	160.18	58.46	27.92	11.56	4.80	9.41	3.85	0.98	4.58	0.10	1001.2	224
9 - 10	1536.9	180.80	207.13	74.49	30.28	12.26	4.73	11.31	3.99	1.32	4.70	0.20	1023.6	216
10 - 11	1424.9	148.38	194.11	71.59	31.42	12.39	4.27	10.97	4.32	1.27	4.65	0.08	1015.5	216
11 - 12	1511.9	188.40	215.13	79.55	32.05	11.82	4.40	13.47	4.60	1.47	4.60	0.17	1141.0	224
12 - 13	1458.8	192.22	228.03	84.97	33.05	11.83	4.82	11.75	5.99	1.44	4.53	0.11	1119.0	216
13 - 14	1926.5	180.17	235.92	97.59	35.53	11.67	4.73	15.07	5.31	1.28	4.56	0.08	1118.6	224
14 - 15	2113.1	136.24	211.79	94.71	35.58	12.50	4.45	12.97	2.88	1.40	4.46	0.12	1124.9	216
15 - 16	1908.7	117.48	220.90	96.04	35.74	11.03	3.79	13.15	5.56	1.39	4.60	0.13	1193.0	224
16 - 17	1863.9	136.96	235.29	103.48	36.62	11.24	3.98	12.42	5.43	1.63	4.62	0.14	1189.6	216
17 - 18	1696.6	188.56	256.87	114.49	37.46	11.33	3.97	16.46	4.28	1.78	4.67	0.09	1184.3	224
18 - 19	1858.4	243.44	282.51	116.90	38.09	10.66	3.73	19.07	5.21	1.72	4.61	0.11	1156.6	216
19 - 20	1926.7	311.97	313.31	124.00	37.95	10.60	3.89	18.17	7.27	2.02	4.62	0.09	1301.6	224
20 - 21	2230.4	321.70	302.30	111.34	35.09	9.71	3.37	19.95	7.54	1.84	4.55	0.08	1375.5	216
21 - 22	2536.1	389.18	324.08	112.66	35.58	10.37	3.26	20.63	8.50	1.68	4.63	0.13	1602.0	217
22 - 23	2753.2	368.98	304.63	107.90	35.11	9.28	3.44	22.95	6.87	1.73	4.55	0.11	1611.6	216
23 - 24	3268.4	333.84	305.85	105.02	34.17	9.66	3.18	21.39	7.32	1.79	4.64	0.13	1898.7	216

********** SEM HOURLY AVERAGE DATA **********

COUNTS/(CM2*SEC*STERAD)

1978. 4.30. (120)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	3967.5	344.64	303.05	107.37	34.90	8.93	3.56	23.16	7.25	1.92	4.48	0.12	2176.6	304
1 - 2	5789.7	407.72	293.65	100.30	33.66	9.18	3.54	26.27	8.42	1.56	4.55	0.13	2194.7	216
2 - 3	4994.1	346.13	302.30	108.08	33.58	9.04	3.22	22.02	7.16	1.90	4.48	0.13	2511.3	224
3 - 4	4714.9	527.22	339.82	112.20	33.02	8.99	3.84	25.72	8.20	1.76	4.67	0.14	2469.6	216
4 - 5	4095.0	527.42	324.37	105.33	32.50	7.64	3.46	22.51	8.46	1.76	4.54	0.10	2229.1	150
5 - 6	4224.0	1095.79	469.58	125.92	31.89	7.97	3.24	50.55	9.64	1.78	4.62	0.08	1142.5	216
6 - 7	5064.3	1202.78	423.20	115.13	31.66	7.76	2.48	41.53	7.38	1.79	4.58	0.06	552.3	224
7 - 8	6156.8	1252.65	434.66	113.90	31.51	8.22	3.04	42.12	8.20	1.44	4.53	0.08	436.8	216
8 - 9	8083.0	1208.34	413.58	114.16	31.02	8.29	2.86	39.55	9.19	1.75	4.49	0.10	356.9	224
9 - 10	12417.0	1325.48	423.02	115.25	29.95	7.50	2.80	49.88	8.87	1.69	4.59	0.07	383.4	216
10 - 11	14401.8	2135.34	668.20	182.90	37.89	7.62	2.86	68.57	13.47	2.22	4.49	0.12	277.3	224
11 - 12	13055.5	2212.21	672.77	181.26	37.48	6.74	2.59	65.13	12.86	2.58	4.49	0.07	258.8	216
12 - 13	11531.0	2265.75	699.74	177.24	34.94	6.80	2.46	70.66	11.54	2.22	4.45	0.09	271.4	224
13 - 14	12772.3	2259.65	766.00	214.82	39.05	5.68	2.45	73.94	13.86	2.34	4.48	0.04	422.5	216
14 - 15	10917.4	2378.93	926.52	289.66	44.78	5.51	2.32	91.84	16.41	3.05	4.59	0.08	490.5	216
15 - 16	13617.6	2680.93	924.11	276.73	42.19	5.61	2.24	94.76	17.42	2.92	4.56	0.15	417.3	224
16 - 17	12229.9	2660.95	1165.08	392.50	55.61	5.92	2.33	113.74	24.83	3.43	4.48	0.08	315.8	216
17 - 18	9365.7	2764.74	1338.97	478.86	66.84	6.27	2.46	127.15	29.50	4.11	4.57	0.07	367.3	224
18 - 19	8744.6	2524.82	1207.65	441.36	64.80	5.75	2.51	122.99	26.38	3.95	4.55	0.16	350.8	216
19 - 20	8059.0	2219.14	1119.41	455.95	68.51	6.00	2.44	114.61	25.87	4.11	4.51	0.07	565.7	224
20 - 21	9447.0	2805.50	1418.93	553.85	79.18	6.84	2.45	143.78	30.04	5.11	4.69	0.11	654.0	216
21 - 22	8958.7	2903.27	1662.96	639.53	86.85	6.66	3.10	167.77	32.84	5.47	4.60	0.08	726.5	224
22 - 23	13543.3	3032.09	1585.84	616.04	88.60	6.53	3.00	166.78	35.58	5.64	4.61	0.18	717.6	216
23 - 24	10970.9	2537.69	1105.72	461.09	80.20	7.14	2.86	130.36	28.22	4.96	4.59	0.06	628.6	224

* SPL = Number of data points (Sampling number) per hour
Blank = no data

SEM HOURLY AVERAGE DATA — 1978. 5. 1. (121)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	9990.0	2078.04	999.40	454.30	84.14	6.74	3.13	114.09	30.22	5.26	4.60	0.12	669.5	168
1 - 2	8093.2	1741.75	949.02	463.68	79.98	7.09	2.52	105.99	30.04	5.07	4.52	0.20	618.4	224
2 - 3	6997.6	1773.23	1064.64	495.30	76.45	7.55	2.77	112.91	28.71	4.92	4.59	0.10	606.4	216
3 - 4	6251.2	2315.78	1360.87	538.65	81.05	7.57	2.73	138.11	32.07	4.75	4.64	0.09	607.3	224
4 - 5	7023.1	2431.64	1331.89	514.24	80.30	7.35	2.68	133.39	35.39	4.79	4.61	0.21	548.7	133
5 - 6	7627.2	2449.44	1272.39	477.25	70.48	8.03	2.90	127.15	32.48	4.39	4.56	0.12	477.8	216
6 - 7	8036.8	2330.74	1185.04	443.69	69.89	7.65	2.58	125.66	28.86	4.43	4.62	0.19	455.7	224
7 - 8	8810.3	2336.36	1142.46	445.82	75.37	7.71	2.99	144.06	27.38	5.21	4.80	0.11	453.8	216
8 - 9	9350.9	2253.76	1118.95	438.29	77.42	8.60	2.93	150.22	29.25	5.27	4.81	0.07	447.7	221
9 - 10	9510.9	2302.67	1166.41	441.93	71.30	7.93	2.65	131.86	29.15	4.07	4.63	0.08	440.4	216
10 - 11	10896.5	2370.51	1215.40	468.12	76.91	7.25	2.57	135.65	32.60	4.79	4.75	0.10	476.3	224
11 - 12	7075.6	1890.95	1020.52	383.53	62.42	7.75	2.41	122.49	24.06	4.44	4.75	0.13	397.3	216
12 - 13	7753.8	2176.39	937.26	302.69	52.13	9.93	2.82	216.89	30.47	5.01	4.74	0.14	351.7	224
13 - 14	6029.1	1316.51	624.11	202.30	42.18	10.17	2.70	129.09	20.40	3.32	4.76	0.06	240.2	216
14 - 15	4450.3	949.44	482.58	155.28	37.61	9.11	1.96	90.33	18.49	2.71	4.51	0.14	182.3	224
15 - 16	4444.8	944.69	492.86	161.99	36.47	8.32	2.22	97.27	15.74	2.58	4.63	0.08	189.4	216
16 - 17	4371.6	968.36	494.15	159.23	34.64	7.61	2.20	107.38	15.61	2.83	4.52	0.03	197.1	[illegible]
17 - 18	4578.3	1056.77	511.81	158.48	35.17	7.94	2.20	106.31	16.52	2.94	4.70	0.12	211.5	216
18 - 19	6152.3	1380.23	567.19	177.12	38.56	7.99	2.17	150.72	17.53	3.75	4.67	0.06	249.2	224
19 - 20	9969.3	1971.54	684.41	172.04	30.55	5.41	1.76	225.75	22.73	3.11	4.56	0.05	248.7	216
20 - 21	8008.6	2312.20	805.02	189.46	32.04	4.88	1.74	275.20	30.04	3.89	4.56	0.05	256.5	216
21 - 22	6716.2	1879.00	636.13	152.43	27.64	5.18	1.50	212.29	22.66	3.16	4.53	0.08	213.4	224
22 - 23	9436.7	1349.32	441.26	96.69	20.10	3.85	1.28	172.88	14.97	2.15	4.40	0.05	128.9	216
23 - 24	6574.5	1463.82	404.49	81.75	17.63	3.40	1.47	221.65	16.68	1.92	4.44	0.01	112.9	224

SEM HOURLY AVERAGE DATA — 1978. 5. 2. (122)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	4019.3	769.36	277.86	55.88	15.40	2.67	1.26	122.93	9.12	1.34	4.46	0.05	84.2	168
1 - 2	3075.2	725.39	270.02	56.38	15.66	3.15	1.12	102.83	9.19	1.02	4.52	0.10	84.5	224
2 - 3	3367.1	721.24	264.96	52.49	15.29	2.74	1.19	95.27	7.83	1.25	4.40	0.05	85.9	224
3 - 4	3506.3	573.96	228.37	48.30	15.27	2.53	1.08	80.48	7.65	1.04	4.34	0.04	94.1	224
4 - 5	2664.2	461.99	228.53	45.88	14.86	2.52	0.99	70.78	7.04	0.91	4.42	0.08	88.0	88
5 - 6	2543.4	431.18	199.09	46.93	14.18	2.46	1.17	57.37	5.23	0.86	4.39	0.07	72.0	192
6 - 7	3218.8	569.46	225.87	42.90	14.37	1.91	1.02	70.06	6.76	0.84	4.40	0.13	64.5	216
7 - 8	2608.2	538.64	220.10	43.07	13.89	2.43	1.01	68.09	7.38	0.91	4.43	0.03	59.0	224
8 - 9	2854.7	501.95	204.25	39.14	13.56	2.10	0.97	58.53	6.43	0.82	4.32	0.04	87.9	216
9 - 10	2562.1	484.43	201.15	39.57	13.22	2.36	0.96	60.47	5.32	0.73	4.45	0.06	88.5	224
10 - 11	7193.2	468.79	200.70	39.36	13.05	1.85	1.04	51.31	4.81	0.65	4.41	0.09	238.4	224
11 - 12	4032.0	410.66	186.90	37.18	12.89	1.94	1.00	50.88	5.76	0.83	4.38	0.04	296.9	216
12 - 13	2683.9	411.07	179.37	34.27	12.85	2.12	1.04	49.17	4.38	0.51	4.35	0.06	217.8	224
13 - 14	2281.4	402.24	185.90	34.59	12.81	2.21	0.92	47.89	5.43	0.78	4.37	0.07	67.0	216
14 - 15	6264.5	397.81	178.75	33.69	12.42	1.79	1.23	45.43	3.63	0.54	4.35	0.01	339.8	[illegible]
15 - 16	3669.3	301.80	170.49	32.05	11.97	1.88	1.34	40.91	3.66	0.36	4.38	0.04	513.3	216
16 - 17	2923.4	305.77	165.95	31.34	11.70	1.78	1.02	40.35	5.10	0.53	4.40	0.07	452.4	224
17 - 18	4227.5	251.53	155.92	27.11	11.43	2.00	1.08	36.14	2.22	0.40	4.30	0.07	439.8	216
18 - 19	6215.3	171.41	130.52	24.87	11.43	1.57	1.30	34.31	1.82	0.31	4.43	0.02	468.5	224
19 - 20	4959.6	85.19	117.78	23.23	10.99	2.09	1.15	22.06	2.00	0.32	4.38	0.07	579.8	216
20 - 21	4234.8	76.25	123.04	22.45	10.90	1.72	1.31	19.24	2.46	0.35	4.30	0.08	657.7	224
21 - 22	4573.0	107.75	122.99	22.18	10.81	1.80	1.18	24.50	2.77	0.40	4.33	0.06	651.7	216
22 - 23	8332.7	102.51	113.74	19.70	10.72	1.82	1.09	21.27	1.60	0.27	4.33	0.06	690.4	224
23 - 24	30253.9	170.83	109.97	17.11	10.15	1.55	1.18	20.06	1.66	0.31	4.37	0.10	2379.9	216

SEM HOURLY AVERAGE DATA — 1978. 5. 3. (123)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	31015.6	88.37	90.08	13.86	9.89	1.42	1.26	11.69	1.00	0.19	4.30	0.11	3175.5	168
1 - 2	13822.8	58.58	103.51	16.46	10.01	1.41	1.30	12.40	2.78	0.21	4.36	0.06	2075.3	224
2 - 3	9776.9	75.05	103.82	15.19	9.95	1.48	1.10	12.86	1.44	0.18	4.36	0.11	1539.6	216
3 - 4	9594.9	86.42	106.73	15.97	9.86	1.67	1.24	15.18	1.50	0.19	4.34	0.02	1706.9	224
4 - 5	23709.3	131.28	106.50	16.10	9.89	1.46	1.26	17.07	1.04	0.27	4.37	0.09	2141.9	215
5 - 6	11410.4	82.47	98.93	13.67	9.51	1.45	1.19	11.22	0.86	0.12	4.30	0.05	1739.6	224
6 - 7	11582.5	79.21	96.78	14.07	9.90	1.62	1.19	12.30	2.00	0.23	4.31	0.05	2582.3	216
7 - 8	4612.4	113.48	106.68	15.02	9.68	1.48	1.12	15.85	1.57	0.21	4.29	0.04	1273.8	213
8 - 9	3408.1	117.06	101.76	14.77	9.59	1.56	1.20	15.52	1.33	0.16	4.30	0.02	1285.9	216
9 - 10	5529.0	104.12	101.39	13.78	9.56	1.38	1.16	11.54	0.86	0.10	4.36	0.08	2753.3	224
10 - 11	4224.0	64.46	94.95	11.85	9.25	1.36	1.39	6.87	0.78	0.08	4.33	0.08	3283.3	216
11 - 12	896.3	69.27	93.11	12.20	9.32	1.28	1.03	6.41	0.53	0.08	4.32	0.03	345.1	224
12 - 13	1182.5	56.04	92.45	11.51	9.26	1.36	1.09	5.21	0.33	0.07	4.32	0.08	1073.1	216
13 - 14	1381.1	35.38	88.83	11.14	9.28	1.32	1.31	3.96	0.43	0.03	4.29	0.03	1244.4	224
14 - 15	260.7	16.52	84.25	10.26	9.25	1.26	0.86	1.55	0.44	0.02	4.33	0.08	226.5	216
15 - 16	8304.0	10.20	83.14	9.68	9.06	1.38	1.27	1.00	0.44	0.08	4.28	0.06	1790.6	216
16 - 17	3526.3	18.39	85.73	9.94	9.19	1.39	1.52	2.46	0.21	0.02	4.30	0.03	2233.4	224
17 - 18	3050.0	19.62	85.47	10.23	9.15	1.28	1.37	1.66	0.22	0.02	4.28	0.08	1444.7	216
18 - 19	2504.3	20.74	83.38	10.42	9.32	1.39	1.56	1.92	0.53	0.06	4.29	0.03	2289.9	224
19 - 20	3071.1	27.49	86.58	11.03	9.33	1.54	1.73	3.33	0.33	0.11	4.30	0.02	2572.4	216
20 - 21	26120.9	13.58	84.55	10.02	9.15	1.31	1.96	1.50	0.53	0.06	4.32	0.01	2243.9	224
21 - 22	18381.0	10.86	82.36	9.80	9.25	1.38	1.98	1.00	0.11	0.01	4.27	0.05	4442.5	216
22 - 23	26309.7	11.76	81.45	9.89	9.10	1.23	2.05	1.39	0.43	0.03	4.28	0.07	4757.1	224
23 - 24	22922.4	6.21	83.69	9.38	9.15	1.34	2.29	0.55	0.55	0.02	4.32	0.02	6995.7	216

* SPL = Number of data points (Sampling number) per hour
Blank = no data

•••••••••••••••••••• SEM HOURLY AVERAGE DATA ••••••••••••••••••••

1978. 5. 4. (124)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	9745.4	8.27	81.67	9.26	9.29	1.26	1.79	0.57	0.86	0.05	4.26	0.03	5946.5	168
1 - 2	2781.0	5.88	81.37	9.38	8.99	1.27	1.31	1.00	0.0	0.05	4.32	0.08	1386.3	216
2 - 3	2881.3	6.31	81.67	9.47	9.08	1.40	1.13	0.53	0.0	0.02	4.32	0.02	1043.1	224
3 - 4	287.3	4.55	80.92	9.38	9.01	1.34	1.19	0.67	0.0	0.0	4.28	0.05	367.2	216
4 - 5	227.9	6.29	80.51	9.23	9.10	1.49	0.97	0.60	0.0	0.03	4.34	0.0	283.2	80
5 - 6	510.1	5.65	80.70	9.32	8.99	1.42	0.97	0.55	0.11	0.06	4.31	0.02	452.5	216
6 - 7	229.9	6.98	81.48	9.26	9.07	1.32	1.00	0.44	0.22	0.01	4.38	0.05	182.8	216
7 - 8	265.8	9.73	81.45	9.39	9.16	1.47	1.09	0.32	0.21	0.03	4.33	0.03	273.8	224
8 - 9	229.7	11.42	81.15	9.49	9.03	1.44	1.27	1.11	0.0	0.04	4.30	0.08	119.9	216
9 - 10	327.2	9.19	80.92	9.34	9.13	1.48	1.16	0.86	0.21	0.05	4.33	0.05	152.8	224
10 - 11	147.6	13.41	81.81	9.38	9.17	1.28	0.76	0.89	0.11	0.04	4.32	0.06	23.1	216
11 - 12	151.2	17.32	82.95	9.57	9.21	1.57	1.17	1.28	0.43	0.05	4.35	0.02	19.0	224
12 - 13	148.2	12.08	82.70	9.59	8.89	1.61	1.08	0.55	0.11	0.0	4.28	0.06	17.2	216
13 - 14	470.3	11.41	82.52	9.55	9.09	1.57	1.02	1.67	0.21	0.01	4.32	0.02	153.4	224
14 - 15	1251.9	9.53	81.48	9.43	9.20	1.49	1.19	0.89	0.0	0.04	4.31	0.05	273.8	216
15 - 16	730.2	8.34	81.67	9.32	9.16	1.41	0.93	0.96	0.0	0.06	4.35	0.05	265.4	224
16 - 17	838.4	8.20	82.25	9.41	9.02	1.27	1.19	0.67	0.0	0.04	4.32	0.10	188.3	216
17 - 18	2564.6	5.34	80.81	9.21	9.01	1.33	1.20	1.07	0.0	0.02	4.32	0.02	552.2	224
18 - 19	4085.6	8.09	81.48	9.41	9.06	1.31	1.39	0.89	0.78	0.02	4.33	0.04	465.2	216
19 - 20	5360.2	6.20	80.49	9.22	9.08	1.30	1.34	0.75	0.32	0.05	4.32	0.03	486.8	224
20 - 21	5266.5	4.88	81.03	9.30	9.07	1.81	1.19	1.11	0.44	0.01	4.37	0.05	520.4	216
21 - 22	6472.6	4.10	79.93	9.20	9.13	1.33	1.45	0.78	0.44	0.05	4.33	0.05	646.4	216
22 - 23	7193.6	2.78	80.28	9.30	9.07	1.31	1.46	0.53	0.21	0.09	4.33	0.02	730.8	224
23 - 24	8661.3	3.33	81.03	9.20	9.21	1.36	1.14	0.55	0.33	0.02	4.33	0.06	879.6	216

•••••••••••••••••••• SEM HOURLY AVERAGE DATA ••••••••••••••••••••

1978. 5. 5. (125)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	8764.8	1.36	81.36	9.04	8.94	1.35	1.33	0.82	0.0	0.01	4.34	0.09	912.3	176
1 - 2	10135.2	2.44	79.93	9.25	9.08	1.70	1.31	0.67	0.55	0.07	4.32	0.01	993.2	216
2 - 3	11769.6	3.85	80.49	9.24	9.10	1.37	1.31	0.53	1.07	0.03	4.30	0.05	1129.8	224
3 - 4	12631.6	3.66	80.92	9.12	9.11	1.57	1.37	0.44	0.55	0.06	4.34	0.05	1126.4	216
4 - 5	11337.7	4.92	78.89	9.12	8.91	1.55	1.11	0.43	0.43	0.0	4.37	0.07	974.6	112
5 - 6	9769.8	4.21	80.37	9.19	9.25	1.46	1.21	0.55	0.22	0.04	4.37	0.03	773.4	216
6 - 7	8543.1	2.03	80.39	9.16	9.04	1.58	1.10	0.75	0.75	0.05	4.36	0.02	621.9	224
7 - 8	6873.4	1.33	79.15	9.00	9.23	1.49	1.16	0.44	0.67	0.05	4.31	0.03	609.7	216
8 - 9	6199.9	1.28	79.53	9.08	8.99	1.64	1.18	0.53	0.21	0.09	4.32	0.05	576.8	224
9 - 10	6213.6	0.55	79.48	8.93	8.97	1.39	1.14	0.11	0.11	0.04	4.33	0.06	555.8	216
10 - 11	5598.1	1.55	79.82	8.88	9.03	1.56	1.15	0.44	0.11	0.04	4.33	0.06	512.2	216
11 - 12	5271.2	0.75	79.53	8.88	9.04	1.68	1.15	0.32	0.32	0.0	4.32	0.05	485.7	224
12 - 13	5438.5	1.11	79.48	8.88	9.06	1.28	1.33	0.0	0.33	0.0	4.30	0.04	514.5	216
13 - 14	5426.9	0.96	79.53	8.90	8.94	1.75	1.38	0.11	0.21	0.03	4.35	0.08	1-1.6	224
14 - 15	5284.2	0.22	79.59	8.93	9.02	1.62	1.55	0.33	0.67	0.04	4.34	0.07	550.6	224
15 - 16	5613.3	0.43	79.10	8.84	9.24	1.54	1.26	0.21	0.21	0.02	4.32	0.06	586.1	224
16 - 17	5773.7	0.22	79.26	8.90	9.00	1.32	1.27	0.0	0.0	0.02	4.30	0.02	606.4	216
17 - 18	6189.7	0.43	79.32	8.80	9.04	1.77	1.19	0.11	0.21	0.03	4.32	0.03	653.8	224
18 - 19	5956.4	0.33	79.59	8.95	9.09	1.62	1.32	0.22	0.22	0.04	4.31	0.10	659.8	216
19 - 20	6227.3	0.11	79.21	8.86	8.99	1.47	1.31	0.11	0.21	0.06	4.28	0.07	693.4	224
20 - 21	6149.8	0.33	79.37	8.93	9.14	1.24	1.57	0.22	0.22	0.06	4.30	0.06	675.2	216
21 - 22	5014.7	4.49	80.17	9.14	9.09	1.67	1.28	0.11	0.32	0.03	4.30	0.03	704.3	224
22 - 23	5972.4	2.22	79.26	9.03	9.08	1.76	1.55	0.22	0.67	0.06	4.31	0.01	1088.6	216
23 - 24	5729.6	0.86	79.21	9.00	9.12	1.62	1.20	0.32	0.43	0.03	4.32	0.08	1226.1	224

•••••••••••••••••••• SEM HOURLY AVERAGE DATA ••••••••••••••••••••

1978. 5. 6. (126)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	5401.9	0.45	79.62	8.94	9.07	1.44	1.55	0.15	0.15	0.05	4.32	0.02	1264.9	160
1 - 2	5881.9	0.78	79.26	8.94	9.09	1.51	1.64	0.55	0.33	0.04	4.39	0.06	1357.2	216
2 - 3	6465.0	0.43	78.89	8.84	9.14	1.74	1.65	0.43	0.53	0.03	4.28	0.09	1460.0	224
3 - 4	7419.7	0.67	79.15	8.91	8.99	1.57	1.33	0.33	0.44	0.02	4.34	0.05	1702.9	216
4 - 5	6708.0	0.65	78.63	9.07	9.07	1.33	1.79	0.65	0.0	0.07	4.27	0.11	1665.6	74
5 - 6	5426.1	0.43	78.88	8.83	9.02	1.57	1.65	0.43	0.76	0.02	4.33	0.07	1455.5	221
6 - 7	4676.0	0.21	79.64	8.85	8.94	1.61	1.83	0.11	0.21	0.05	4.32	0.05	1352.5	224
7 - 8	4170.3	0.22	79.26	8.95	9.15	1.61	1.72	0.11	0.22	0.01	4.30	0.06	1276.4	216
8 - 9	4593.9	0.75	79.64	8.78	9.02	1.64	1.46	0.43	0.21	0.05	4.28	0.06	1310.8	224
9 - 10	3871.0	1.00	78.93	9.01	8.99	1.67	1.66	0.22	1.00	0.04	4.31	0.05	1176.9	216
10 - 11	3754.6	1.07	79.21	8.95	9.15	1.68	1.43	0.21	0.96	0.03	4.30	0.03	1133.6	224
11 - 12	3358.0	0.55	79.15	8.88	9.15	1.64	1.76	0.44	0.44	0.01	4.31	0.07	1130.9	216
12 - 13	3055.9	0.53	79.96	9.02	9.07	1.62	1.87	0.53	0.32	0.03	4.36	0.08	1323.7	224
13 - 14	2899.1	0.44	79.59	9.11	9.20	1.24	2.00	0.11	0.44	0.06	4.32	0.04	1423.5	144
14 - 15	2937.1	1.28	79.53	9.10	8.99	1.67	1.96	0.43	0.21	0.02	4.33	0.09	1440.5	224
15 - 16	2982.0	0.33	79.70	9.01	9.15	1.98	2.04	0.0	0.0	0.01	4.32	0.06	1491.4	216
16 - 17	3088.0	0.33	79.26	8.95	8.99	1.56	1.96	0.0	0.33	0.04	4.31	0.01	1493.2	216
17 - 18	3217.1	0.96	79.21	8.92	9.10	1.69	1.90	0.21	0.32	0.02	4.36	0.07	1513.6	224
18 - 19	3226.3	0.89	79.70	8.87	9.01	1.25	1.90	0.44	0.0	0.0	4.28	0.02	1544.7	216
19 - 20	3421.1	0.96	79.74	8.93	9.08	1.60	1.93	0.32	0.64	0.09	4.32	0.09	1582.5	224
20 - 21	3792.5	0.22	79.48	9.00	9.07	1.70	2.09	0.11	0.67	0.01	4.31	0.05	1638.9	216
21 - 22	3740.9	1.18	79.85	9.10	9.27	1.60	2.06	0.86	0.86	0.03	4.33	0.07	1639.7	224
22 - 23	4220.0	1.77	79.93	8.96	8.99	1.56	2.22	0.55	0.55	0.04	4.37	0.04	1765.3	216
23 - 24	3916.6	0.64	79.53	8.98	9.20	1.72	2.09	0.11	1.07	0.03	4.34	0.05	1880.4	224

* SPL = Number of data points (Sampling number) per hour
Blank = no data

SEM HOURLY AVERAGE DATA — 1978. 5. 7. (127)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	3730.8	1.85	80.39	9.04	9.21	1.73	2.13	0.43	1.28	0.05	4.33	0.12	1754.3	[illegible]
1 - 2	4585.4	1.39	79.96	9.12	9.23	1.65	2.13	0.86	0.96	0.09	4.32	0.03	1800.7	[illegible]
2 - 3	4000.1	1.33	79.59	9.12	9.23	1.49	1.62	0.44	0.55	0.04	4.36	0.0	1717.3	[illegible]
3 - 4	3692.6	1.28	82.10	11.57	15.66	19.85	11.07	0.96	0.75	0.12	4.45	0.19	1695.3	[illegible]
4 - 5	3666.8	21.66	148.46	95.52	104.24	79.51	23.04	7.30	6.64	1.09	5.82	0.69	1917.[illegible]	[illegible]
5 - 6	3541.7	37.09	162.84	124.25	99.63	61.00	15.67	7.27	6.73	1.61	5.54	0.44	1838.[illegible]	[illegible]
6 - 7	3219.2	45.78	161.63	91.79	72.55	45.69	11.72	6.98	6.98	1.08	5.03	0.34	1632.[illegible]	[illegible]
7 - 8	3310.6	65.85	175.76	72.49	52.49	37.10	10.04	8.09	6.55	1.28	4.99	0.32	1766.7	[illegible]
8 - 9	2891.3	87.23	155.16	54.88	42.13	27.44	7.04	5.88	5.21	0.78	4.85	0.22	1765.9	[illegible]
9 - 10	3091.1	92.95	148.71	48.81	37.41	24.43	6.89	8.09	4.77	0.74	4.74	0.17	1688.5	[illegible]
10 - 11	3138.9	68.04	132.50	40.92	31.19	19.00	5.88	9.19	2.35	0.65	4.69	0.22	1682.[illegible]	[illegible]
11 - 12	2759.7	52.60	132.05	34.96	26.30	16.51	5.75	8.54	1.66	0.38	4.59	0.12	1698.[illegible]	[illegible]
12 - 13	2530.4	56.12	123.89	31.65	25.36	15.84	5.31	8.12	2.57	0.29	4.53	0.17	1755.3	[illegible]
13 - 14	2311.1	48.22	112.74	28.73	23.35	13.86	4.67	6.54	2.44	0.29	4.49	0.26	1683.[illegible]	[illegible]
14 - 15	1992.5	49.92	107.80	25.38	21.87	12.17	4.45	4.92	1.07	0.32	4.50	0.12	1595.[illegible]	[illegible]
15 - 16	2485.4	41.68	104.37	23.62	20.57	10.85	3.47	5.88	1.44	0.12	4.50	0.18	1644.3	[illegible]
16 - 17	2908.4	22.98	94.30	19.30	18.86	9.87	3.90	2.57	0.86	0.17	4.60	0.13	1750.[illegible]	[illegible]
17 - 18	2586.0	22.61	94.45	20.67	18.10	8.15	3.65	2.66	1.11	0.22	4.33	0.08	1846.4	[illegible]
18 - 19	3005.0	24.16	94.87	19.91	17.76	7.75	3.49	2.99	1.39	0.12	4.44	0.08	1873.5	[illegible]
19 - 20	3145.2	22.61	91.45	19.01	17.26	7.05	3.08	2.66	1.55	0.23	4.38	0.08	1982.[illegible]	[illegible]
20 - 21	3475.9	13.52	86.58	16.14	15.23	6.25	3.36	2.44	1.55	0.23	4.49	0.14	2206.5	[illegible]
21 - 22	2744.3	7.38	86.75	14.57	14.44	6.46	2.89	2.14	2.46	0.21	4.47	0.14	2360.[illegible]	[illegible]
22 - 23	4966.7	7.54	84.25	14.77	14.46	5.31	3.13	1.11	1.77	0.18	4.36	0.10	2926.[illegible]	[illegible]
23 - 24	5267.8	5.56	84.87	14.61	14.01	5.57	3.29	1.18	2.14	0.12	4.36	0.15	3096.6	[illegible]

SEM HOURLY AVERAGE DATA — 1978. 5. 8. (128)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	5509.0	5.27	87.80	14.30	13.86	5.14	3.22	0.86	3.28	0.19	4.41	0.12	3220.3	[illegible]
1 - 2	6167.4	5.34	87.01	13.99	13.72	4.44	2.70	1.50	2.46	0.10	4.38	0.05	3501.9	[illegible]
2 - 3	7763.8	4.99	86.91	15.20	13.08	4.31	2.96	1.44	3.88	0.06	4.31	0.10	4209.3	[illegible]
3 - 4	5799.7	10.48	88.30	15.46	13.33	4.07	3.22	1.18	2.67	0.15	4.37	0.06	3862.0	[illegible]
4 - 5	4623.9	9.39	88.22	13.73	12.55	4.14	3.06	1.26	2.75	0.14	4.31	0.05	3496.0	[illegible]
5 - 6	4308.3	5.77	84.39	12.96	12.50	4.19	3.45	0.96	2.24	0.10	4.35	0.03	3458.6	[illegible]
6 - 7	4212.9	7.71	85.47	12.89	12.03	3.91	3.43	1.44	2.00	0.14	4.28	0.06	3479.7	[illegible]
7 - 8	3401.4	8.34	85.30	13.02	11.72	3.78	3.25	0.75	2.03	0.20	4.40	0.07	3166.2	[illegible]
8 - 9	3082.6	6.87	81.92	12.83	11.48	3.85	3.58	1.44	2.00	0.11	4.37	0.10	3090.4	[illegible]
9 - 10	2776.3	6.20	83.70	11.89	11.37	3.71	3.24	0.64	1.71	0.07	4.29	0.05	3071.0	[illegible]
10 - 11	2157.9	12.30	84.91	12.48	11.63	3.17	3.28	0.89	1.44	0.08	4.36	0.05	2881.[illegible]	[illegible]
11 - 12	1126.1	19.40	85.03	12.24	11.16	3.06	2.09	1.66	0.67	0.07	4.39	0.13	1620.3	[illegible]
12 - 13	1051.4	14.97	85.84	12.25	11.14	3.14	1.77	1.60	0.11	0.08	4.33	0.09	1210.8	[illegible]
13 - 14	764.8	21.95	86.24	12.66	10.88	3.29	1.48	0.78	1.00	0.07	4.32	0.06	812.[illegible]	[illegible]
14 - 15	573.8	15.39	84.45	12.03	10.89	2.79	1.55	0.96	0.21	0.09	4.35	0.07	749.[illegible]	[illegible]
15 - 16	435.5	15.74	85.19	11.57	10.94	3.14	1.63	0.78	0.0	0.08	4.36	0.08	647.3	[illegible]
16 - 17	367.6	14.75	85.30	11.80	10.34	2.87	1.38	0.64	0.0	0.07	4.35	0.02	476.4	[illegible]
17 - 18	338.9	11.31	84.80	11.60	10.44	2.59	1.62	0.89	0.67	0.04	4.31	0.06	430.3	[illegible]
18 - 19	499.1	13.90	82.52	11.45	10.56	2.45	1.49	1.18	0.11	0.07	4.34	0.05	473.[illegible]	[illegible]
19 - 20	830.9	8.20	84.47	11.13	10.45	2.38	1.36	0.67	0.22	0.07	4.40	0.05	481.9	[illegible]
20 - 21	1305.9	6.20	81.88	10.69	10.53	2.67	1.50	0.32	0.32	0.06	4.32	0.10	709.[illegible]	[illegible]
21 - 22	1464.6	4.43	80.70	10.53	10.28	2.52	1.87	0.33	0.89	0.06	4.28	0.07	1020.7	[illegible]
22 - 23	4641.8	6.84	83.16	10.61	10.31	2.28	1.70	0.53	1.07	0.05	4.30	0.02	1322.0	[illegible]
23 - 24	7067.2	6.54	82.03	10.69	10.07	2.42	1.70	0.11	0.78	0.10	4.43	0.07	2042.8	[illegible]

SEM HOURLY AVERAGE DATA — 1978. 5. 9. (129)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	4526.6	11.09	92.99	11.08	10.31	2.34	1.81	0.41	1.77	0.04	4.34	0.06	2352.7	176
1 - 2	4526.4	14.85	81.92	10.37	10.19	2.20	2.30	1.88	1.55	0.06	4.37	0.07	2387.1	216
2 - 3	5537.9	7.54	80.48	9.96	9.69	2.33	2.21	0.55	1.33	0.02	4.38	0.03	2710.3	216
3 - 4	3751.6	6.20	80.92	9.86	9.87	2.15	1.83	0.86	0.64	0.06	4.29	0.05	2059.4	224
4 - 5	2391.6	5.70	80.96	9.63	9.26	1.11	2.10	0.0	1.14	0.0	4.20	0.12	1682.9	21
5 - 6														0
6 - 7														0
7 - 8														0
8 - 9														0
9 - 10														0
10 - 11														0
11 - 12														0
12 - 13														0
13 - 14														0
14 - 15														0
15 - 16														0
16 - 17														0
17 - 18														0
18 - 19														0
19 - 20														0
20 - 21														0
21 - 22														0
22 - 23														0
23 - 24														0

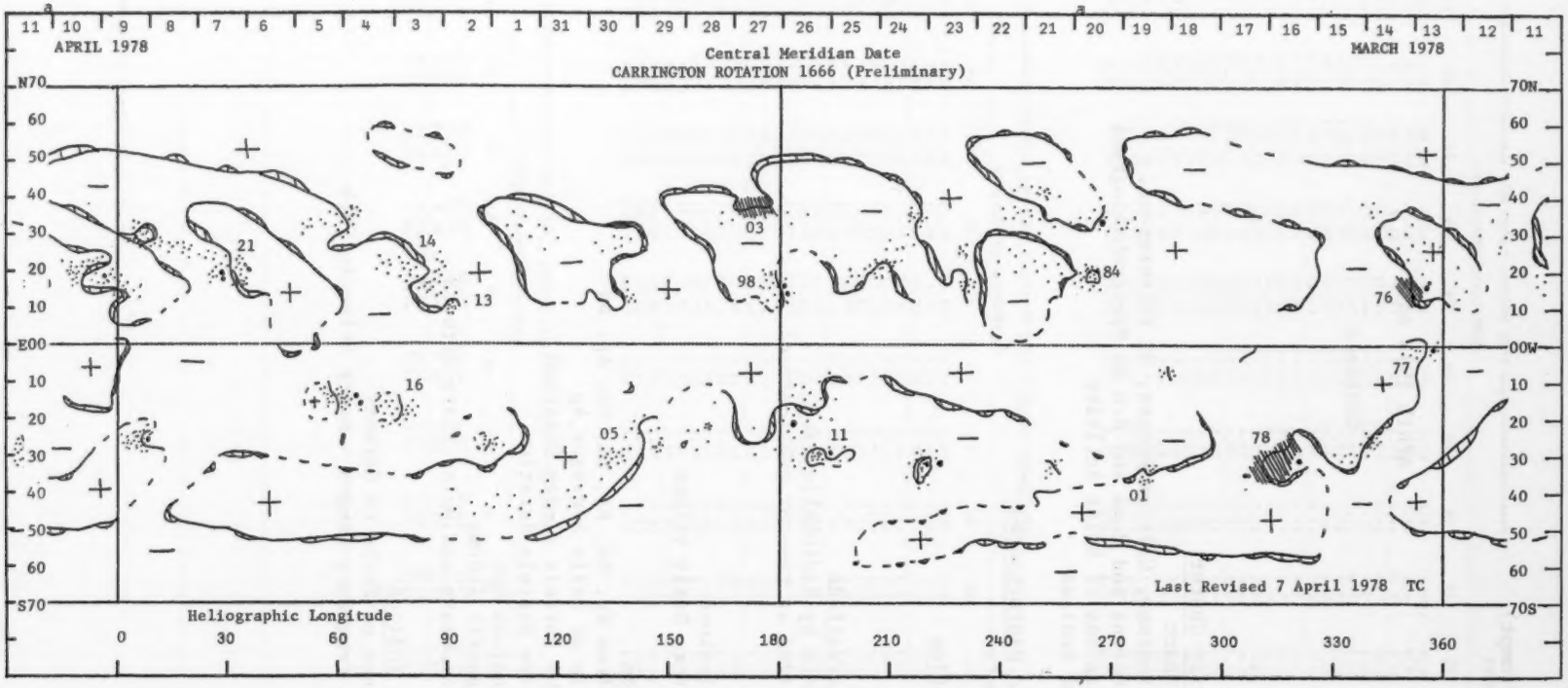
* SPL = Number of data points (Sampling number) per hour
Blank = no data

APRIL 1978 DATA

Contents

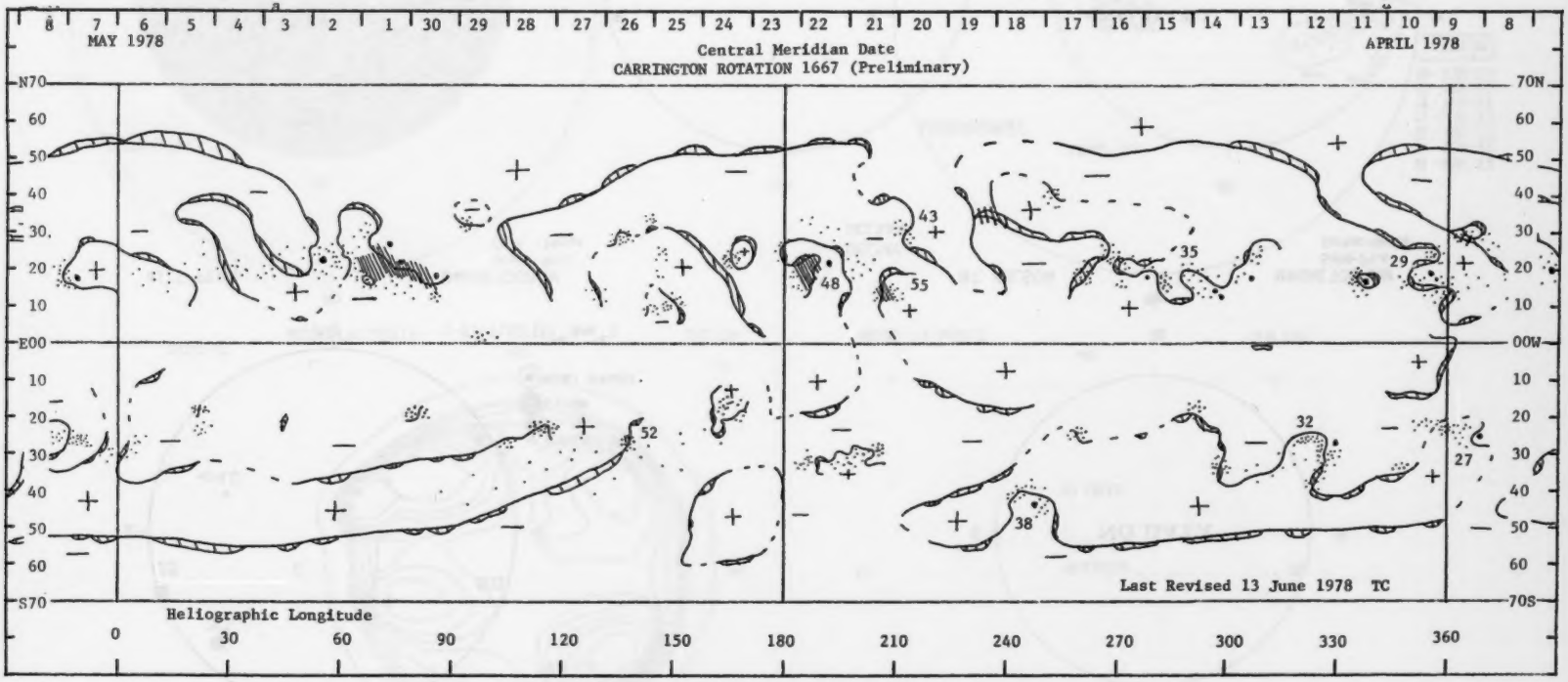
	Page
Daily Solar Activity Center	
Hα Synoptic Chart	52-53
X-ray, Magnetograms, Calcium Plages, Hα Filtergrams, Sunspots, Corona and 2 cm and 8.6 mm Spectroheliograms	54-113
Individual Regions of Solar Activity	114-124
Daily Calcium Indices	124
Sudden Ionospheric Disturbances	
Table of Events	125-128
Solar X-Ray Radiation	
Solrad 11	129-143
Solar Radio Waves	
Spectral Observations	144-158
Selected Events by Radioheliograph (not received at time of publication)	
Cosmic Rays	
Chart of Variations	159-160
Neutron Monitors Daily Values	161
Geomagnetic Indices	
Table of Indices Kp, Kn, Ks, Km, Cp, Ap, aa	162
12-Month Table of Daily Averages Ap	163
Chart of Kp by Bartels 27-day Rotation	164
Chart of Dst by Bartels Rotation	165
Equatorial Indices Dst	166
Principal Magnetic Storms	167-168
Sudden Commencements and Solar Flare Effects	169
Radio Propagation Indices	
Quality Indices on Paths to Germany	170
Transmission Frequency Ranges - North Atlantic Path	171-172

Hα SYNOPTIC CHART
MARCH - APRIL 1978



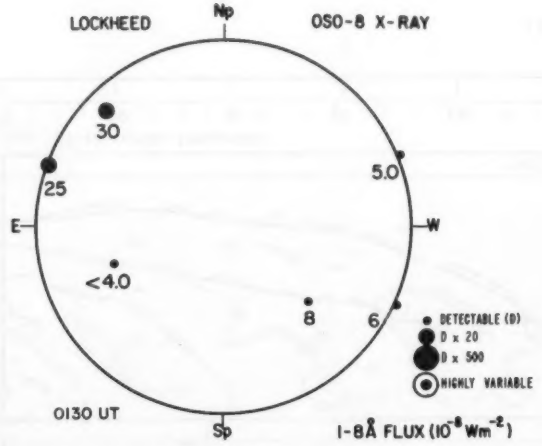
Hα SYNOPTIC CHART

CARRINGTON ROTATION 1667 (PRELIMINARY)



APRIL 1, 1978 (P=-26.19, B_o=-6.54, L_o=114.77)

LOCKHEED OSO-8 X-RAY

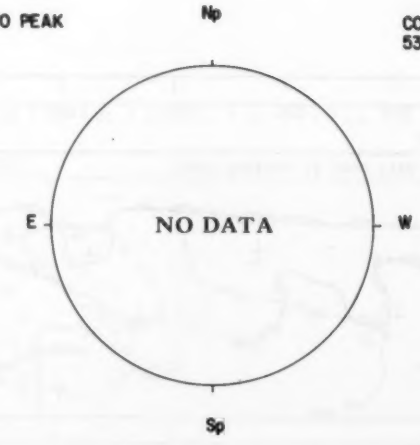


0130 UT

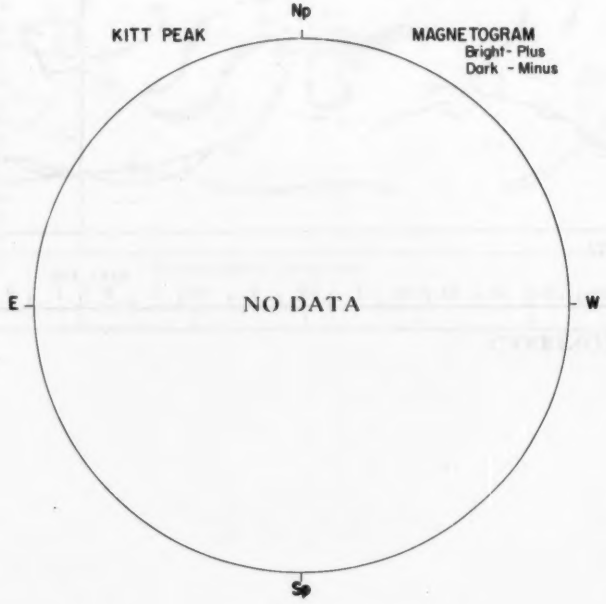
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

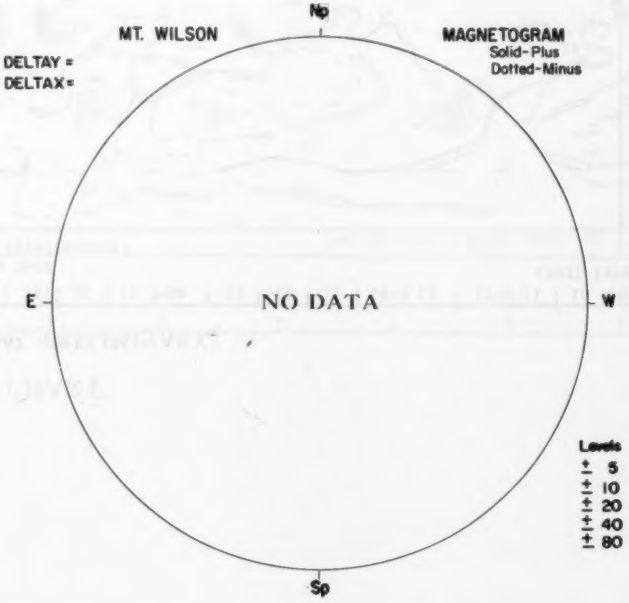


KITT PEAK MAGNETOGRAM
Bright- Plus
Dark - Minus



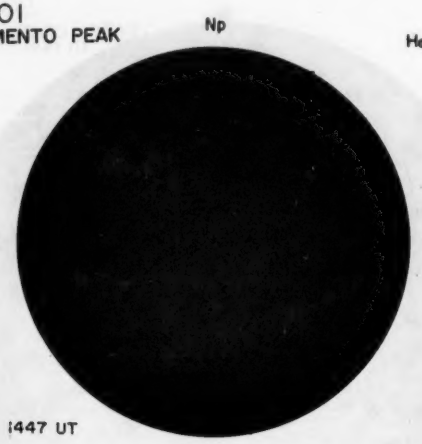
MT. WILSON MAGNETOGRAM
Solid- Plus
Dotted-Minus

DELTAY =
DELTAX =

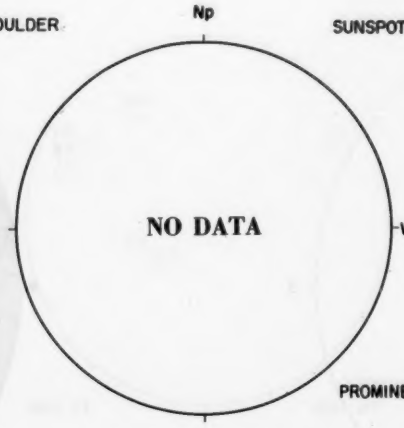


01

SACRAMENTO PEAK

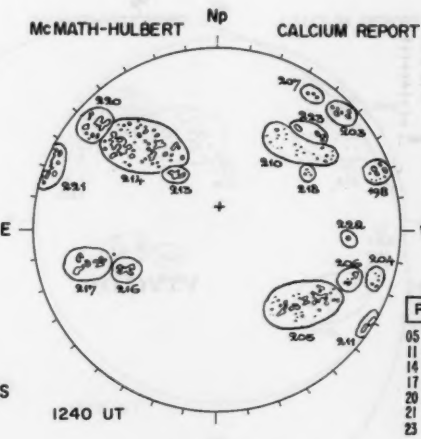


Hα BOULDER



SUNSPOTS

McMATH-HULBERT

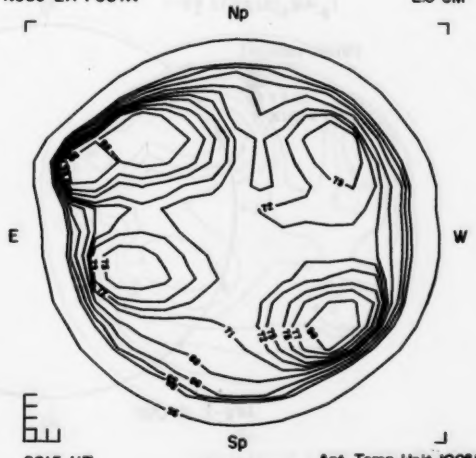


CALCIUM REPORT

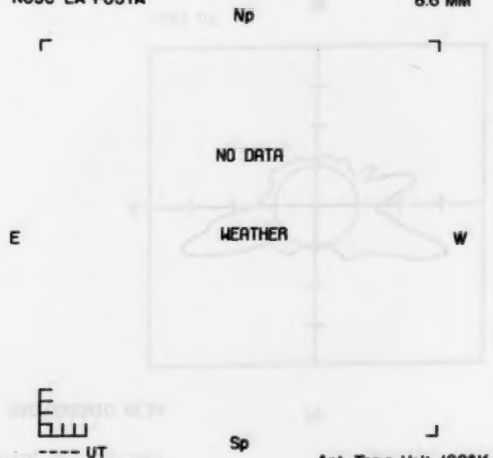
PROMINENCES

POOR	M
05 - 2200 - 2.5	
11 - 1800 - 3.0	
14 - 3200 - 2.5	
17 - 1100 - 2.5	
20 - 1400 - 2.5	
21 - 3300 - 3.5	
23 - 0300 - 2.5	

NOSC LA POSTA 2.0 CM

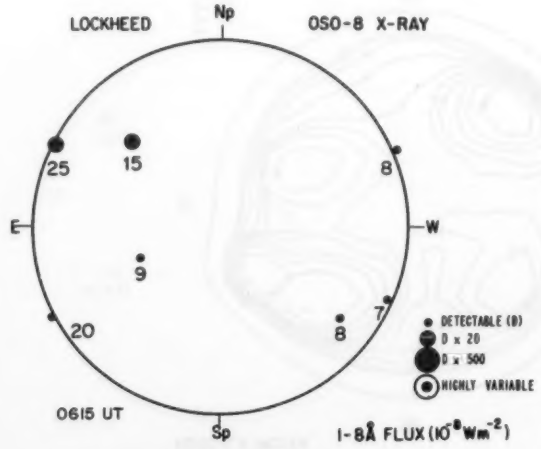


NOSC LA POSTA 8.6 MM



APRIL 2, 1978 (P =-26.23, B_o =-6.49, L_o =101.58)

LOCKHEED OSO-8 X-RAY

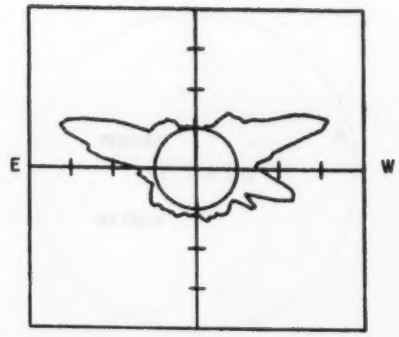


0615 UT

1-8Å FLUX (10^{-8} Wm^{-2})

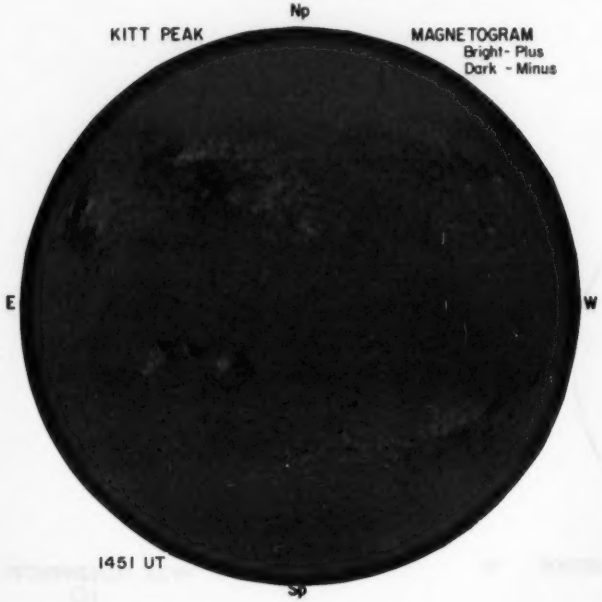
SACRAMENTO PEAK

CORONA (1.15 R_o)
5303 Å



1437 UT

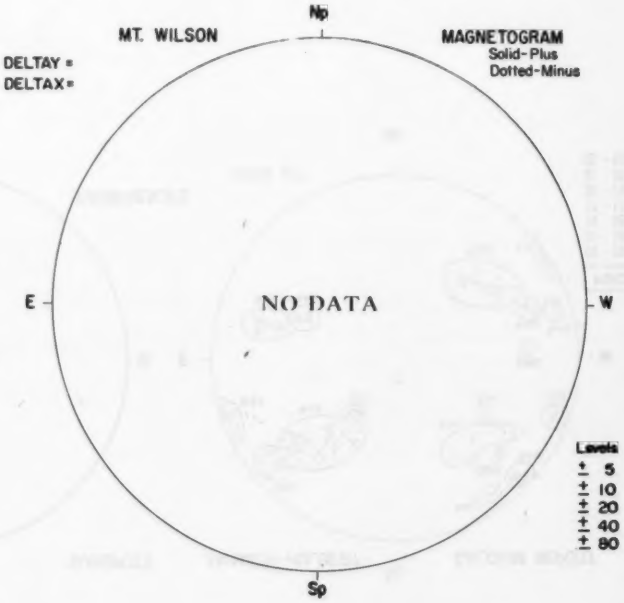
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1451 UT

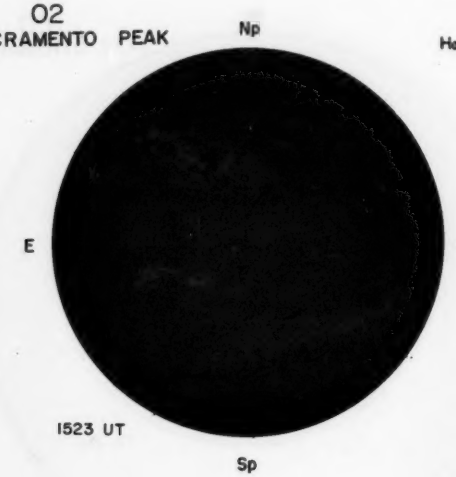
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



02

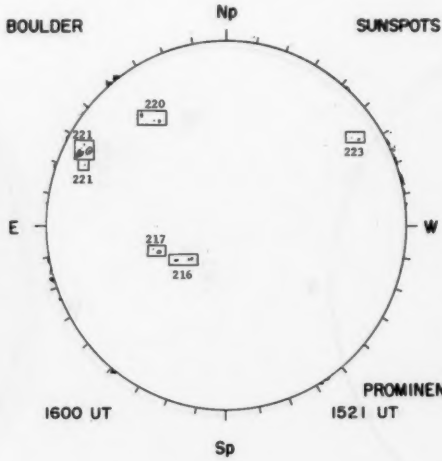
SACRAMENTO PEAK



1523 UT

Hα

BOULDER



1600 UT

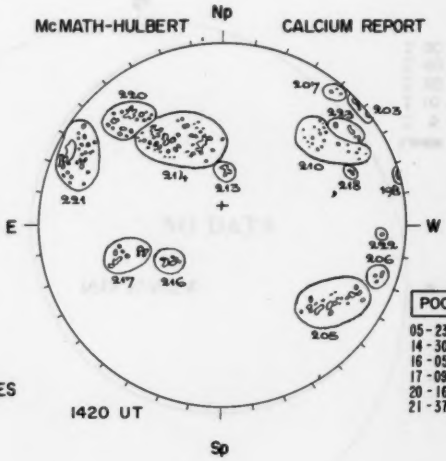
SUNSPOTS

PROMINENCES

1521 UT

McMATH-HULBERT

CALCIUM REPORT

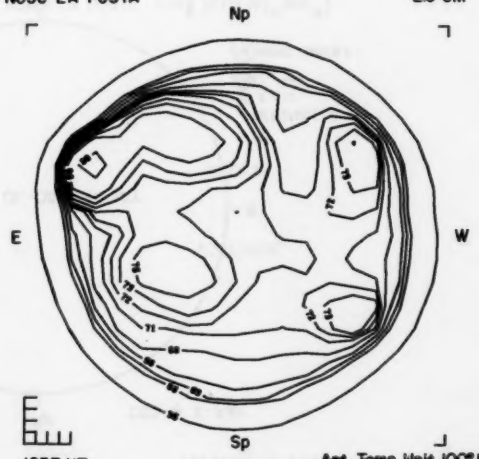


1420 UT

POOR	M
05 - 2300 - 2.5	
14 - 3000 - 2.5	
16 - 0500 - 2.5	
17 - 0900 - 2.5	
20 - 1600 - 2.5	
21 - 3700 - 3.0	

NOSC LA POSTA

2.0 CM



1837 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

---- UT

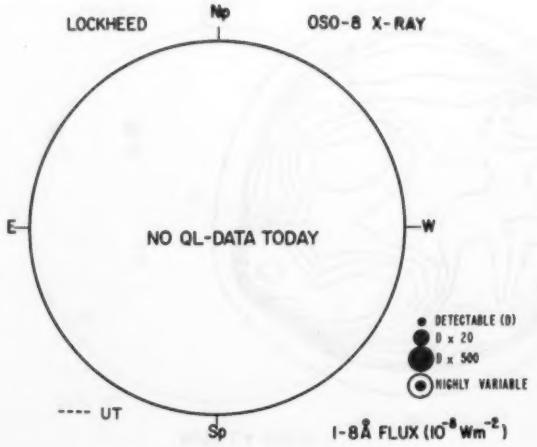
Ant. Temp. Unit 100°K

57

Apr 78

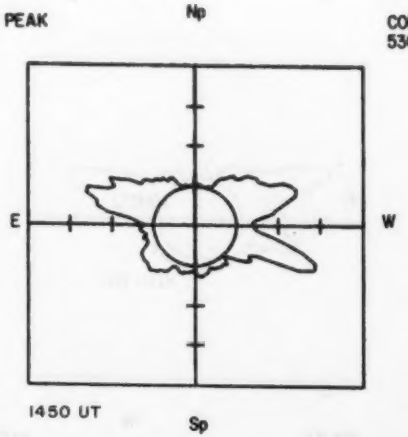
APRIL 3, 1978 (P =-26.26, B_o =-6.43, L_o = 88.38)

LOCKHEED OSO-8 X-RAY

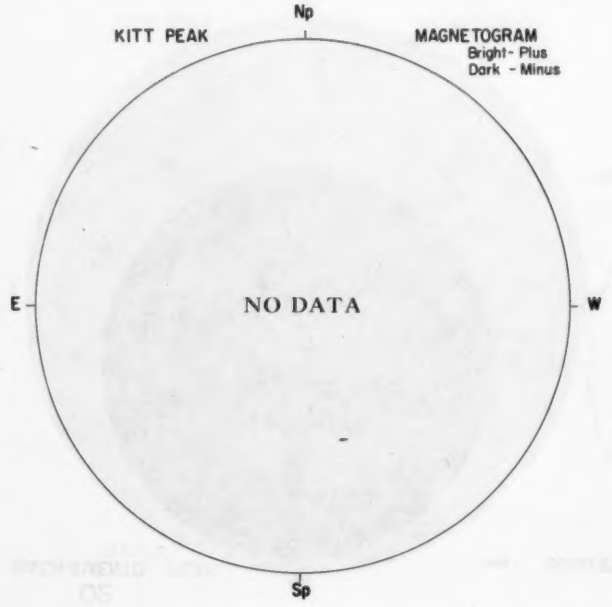


1-8Å FLUX (10^{-8} Wm^{-2})

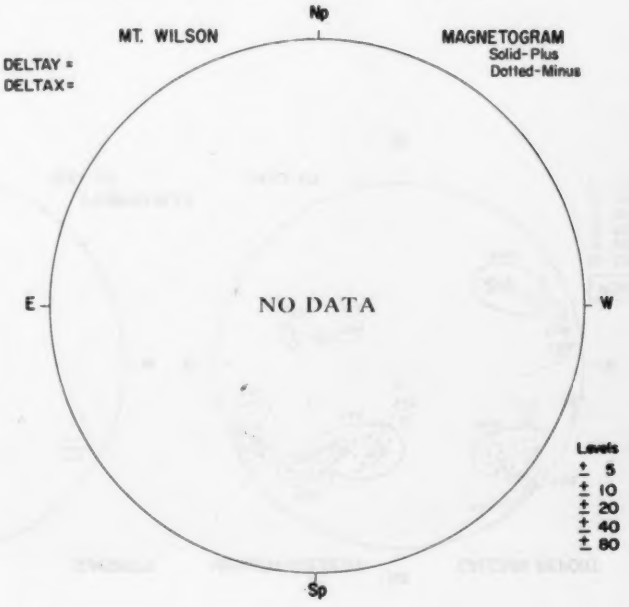
SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

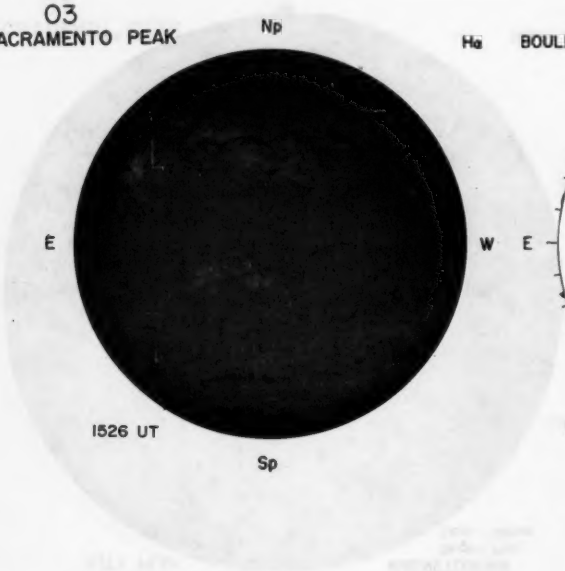


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =



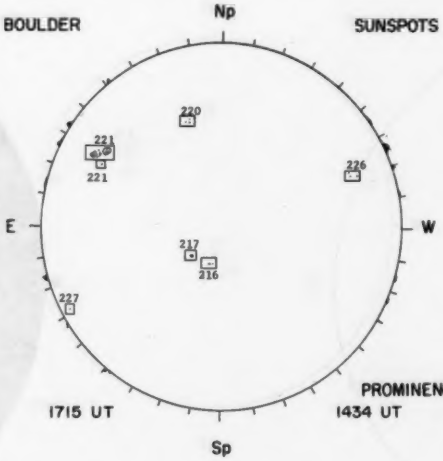
03

SACRAMENTO PEAK



1526 UT

Hα BOULDER



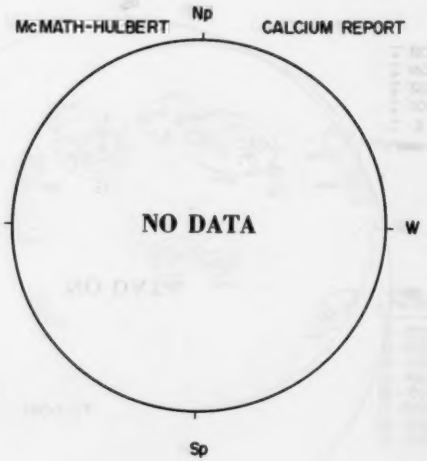
1715 UT

SUNSPOTS

PROMINENCES

1434 UT

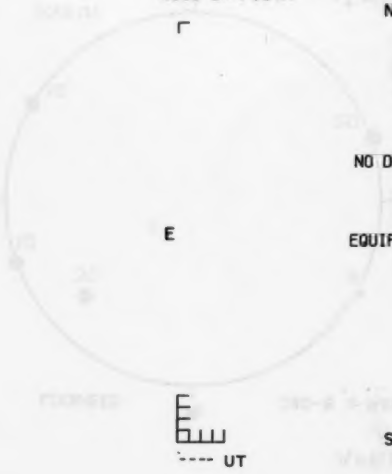
McMATH-HULBERT



CALCIUM REPORT

NOSC LA POSTA

2.0 CM

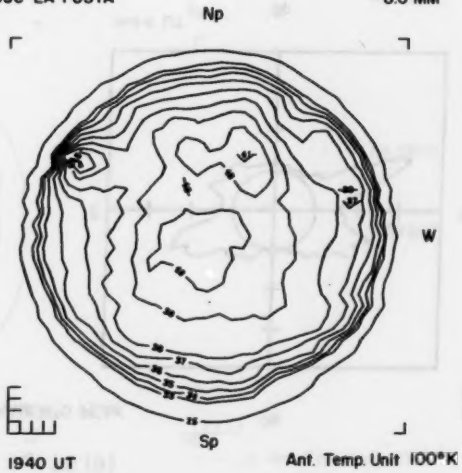


---- UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

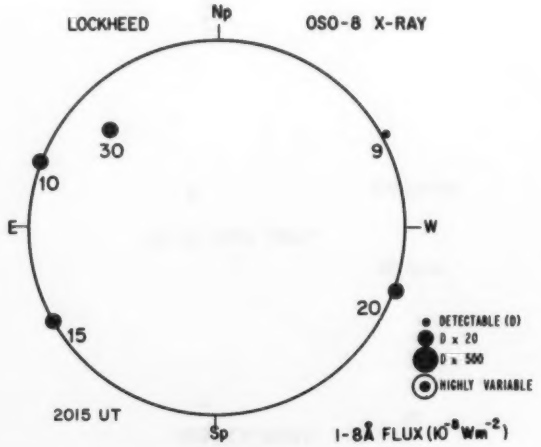


1940 UT

Ant. Temp. Unit 100°K

APRIL 4, 1978 (P=-26.29, B_o=-6.37, L_o=75.19)

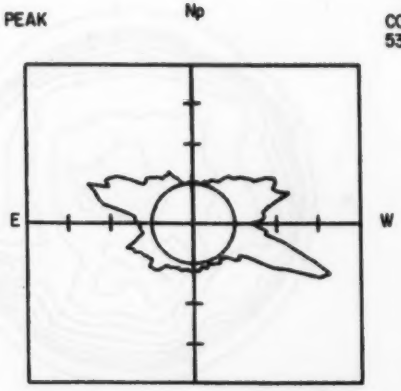
LOCKHEED OSO-8 X-RAY



2015 UT

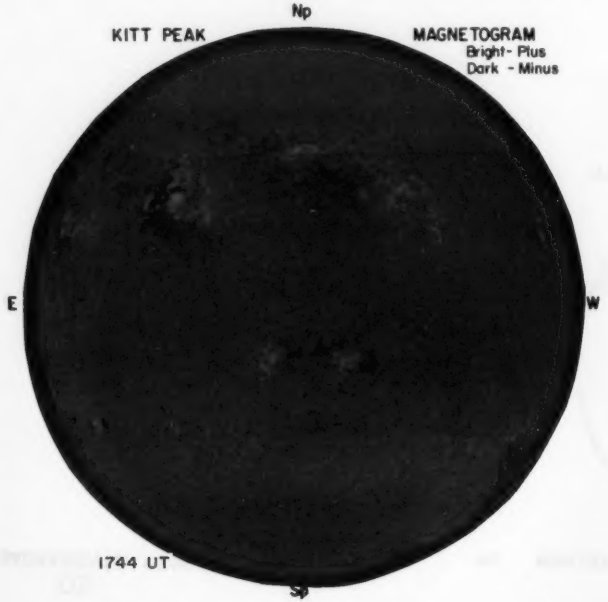
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



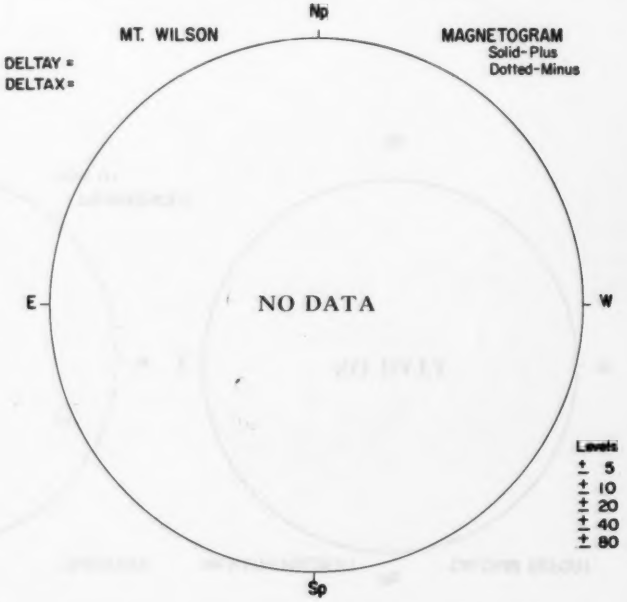
1444 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



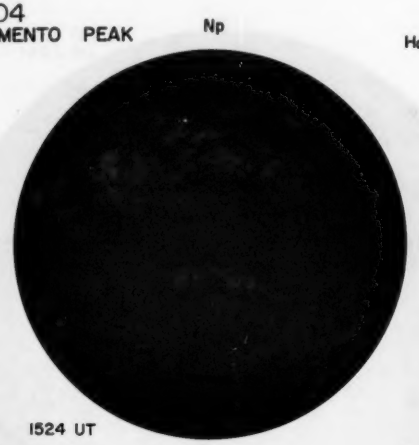
1744 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =



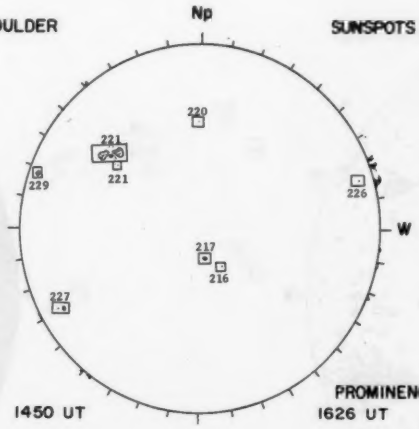
04

SACRAMENTO PEAK



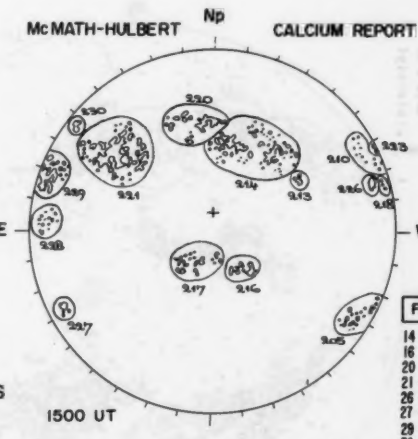
1524 UT

Hα BOULDER



1450 UT

SUNSPOTS



PROMINENCES

1626 UT

McMATH-HULBERT

CALCIUM REPORT

1500 UT

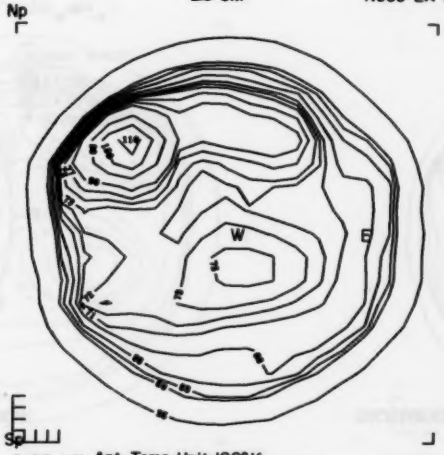
FAIR | S

14 - 2800 - 2.5
16 - 0700 - 2.5
20 - 1500 - 2.5
21 - 4500 - 3.5
26 - 1000 - 3.0
27 - 0700 - 3.5
29 - 3600 - 3.0
30 - 0600 - 2.5

NOSC LA POSTA

2.0 CM

NOSC LA POSTA



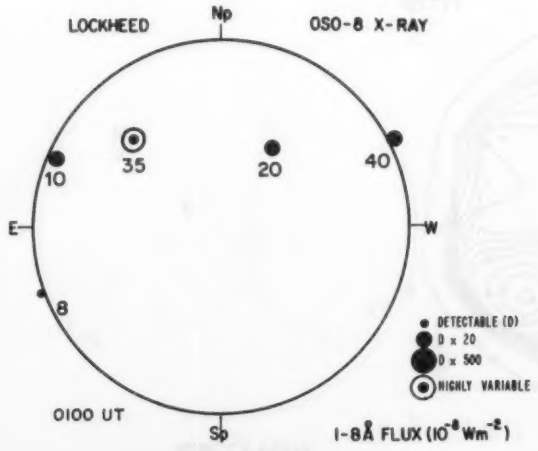
2123 UT Ant. Temp. Unit 100°K

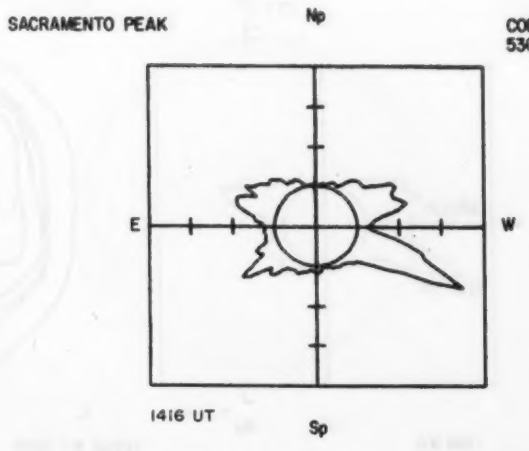
8.6 MM

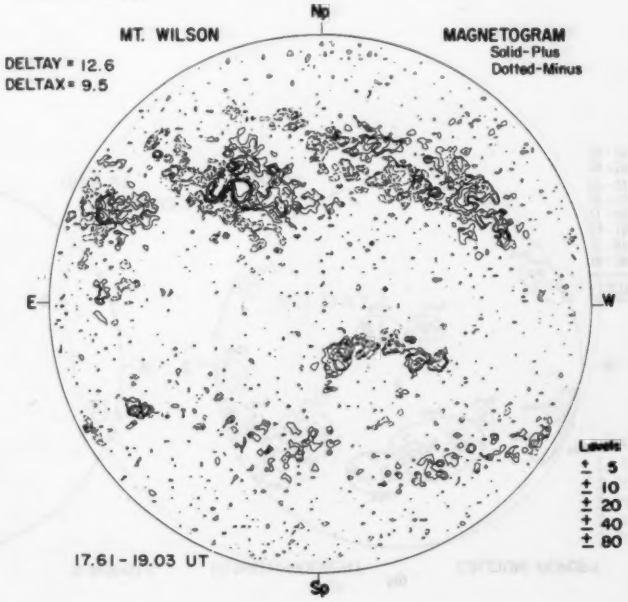
---- UT Ant. Temp. Unit 100°K

61
Apr 78

APRIL 5, 1978 (P = -26.31, B_o = -6.31, L_o = 61.99)

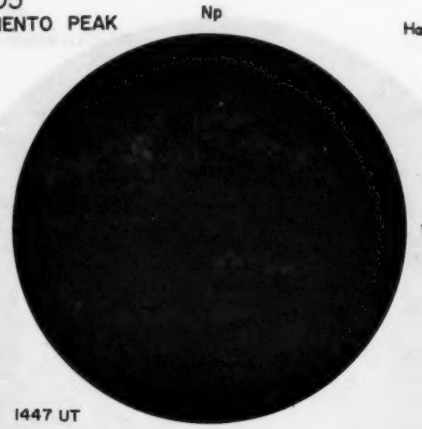






05

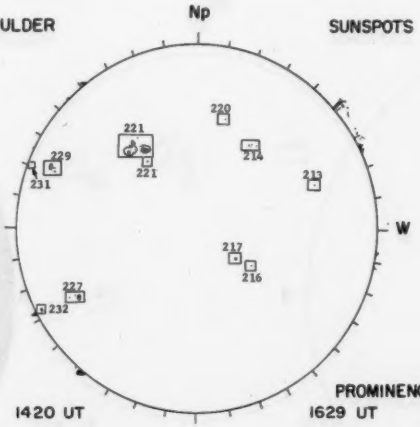
SACRAMENTO PEAK



1447 UT

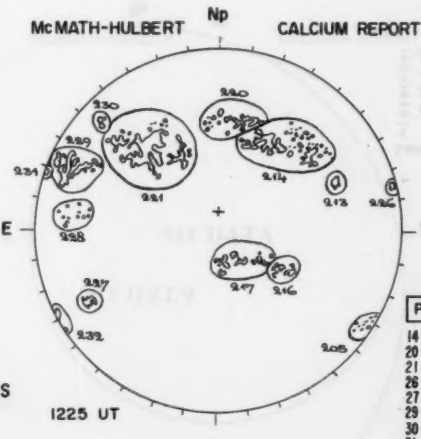
Hα

BOULDER



1420 UT

SUNSPOTS



1629 UT

McMATH-HULBERT

1225 UT

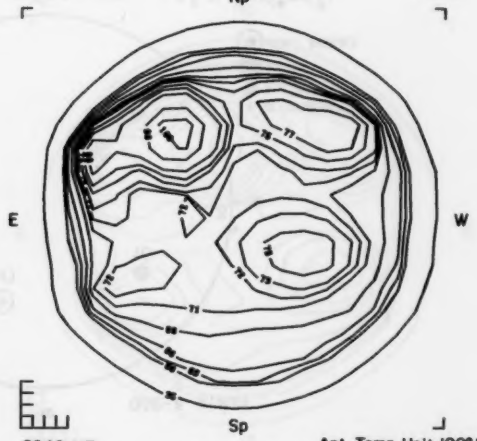
CALCIUM REPORT

PROMINENCES

POOR	S
14 - 3000 - 2.5	
20 - 1500 - 2.5	
21 - 5000 - 3.5	
26 - 0700 - 3.0	
27 - 0600 - 3.5	
29 - 3600 - 3.0	
30 - 0500 - 2.5	
31 - 0700 - 3.0	
32 - 1100 - 2.5	

NOSC LA POSTA

2.0 CM

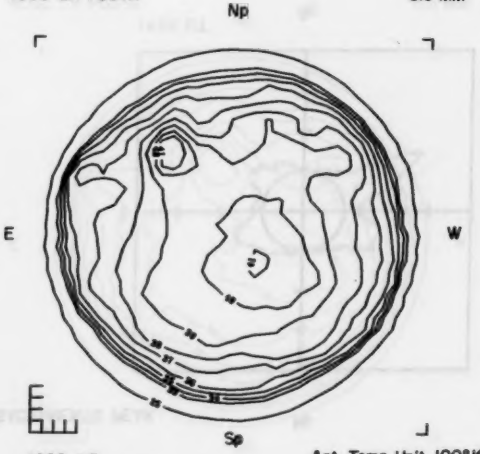


2042 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

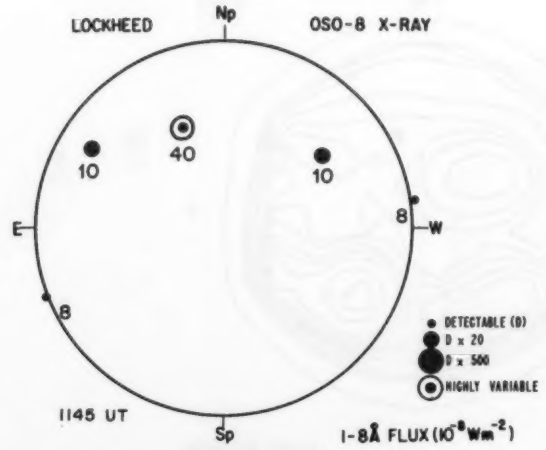


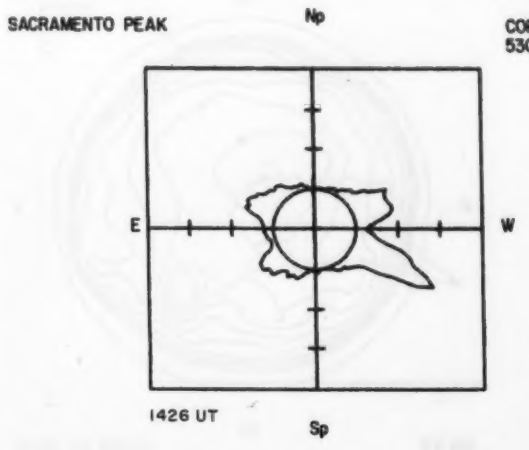
1923 UT

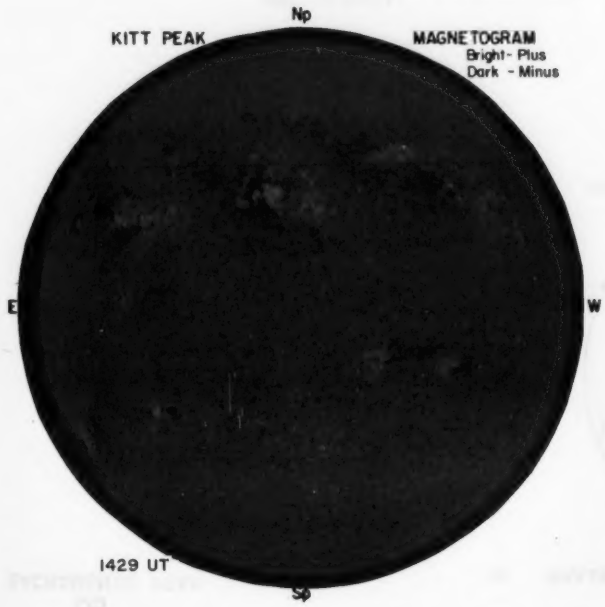
Ant. Temp. Unit 100°K

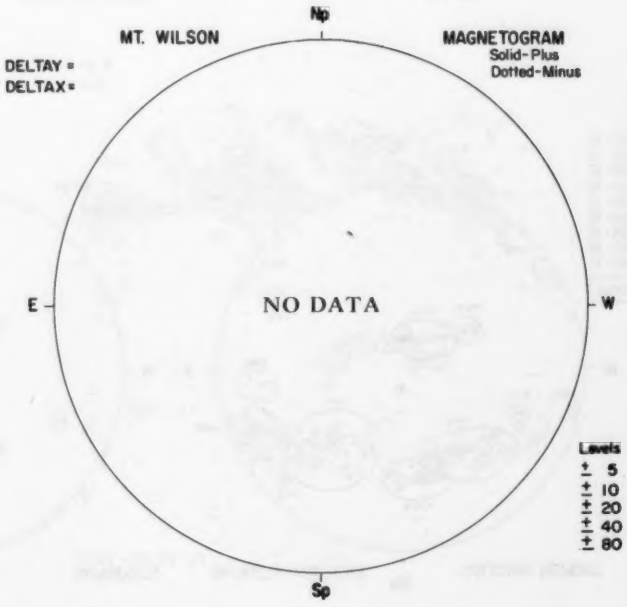
63
Apr 78

APRIL 6, 1978 (P = -26.32, B_o = -6.25, L_o = 48.80)



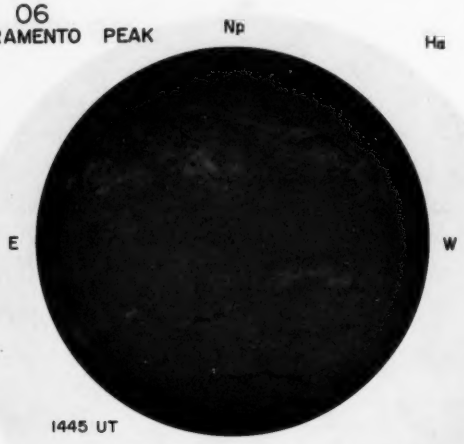






06

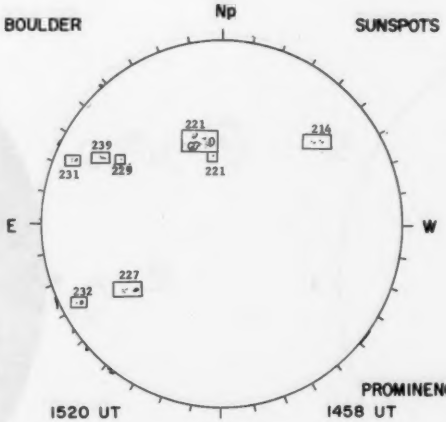
SACRAMENTO PEAK



1445 UT

Hα

BOULDER



1520 UT

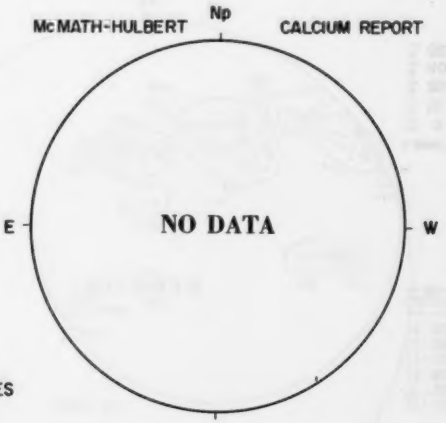
SUNSPOTS

PROMINENCES

1458 UT

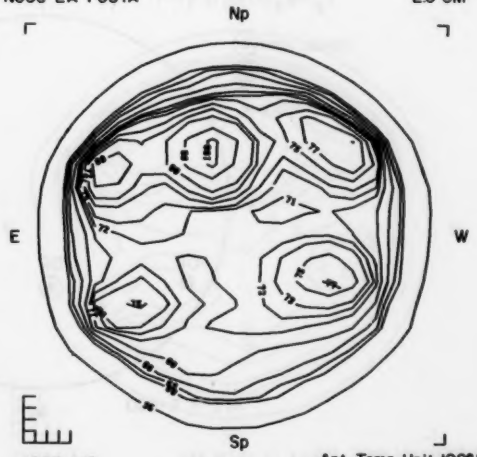
McMATH-HULBERT

CALCIUM REPORT



NOSC LA POSTA

2.0 CM

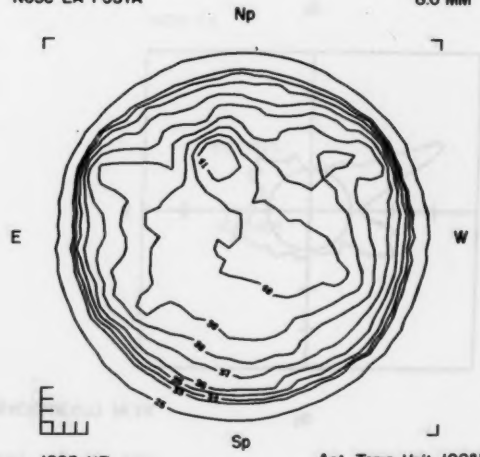


1922 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

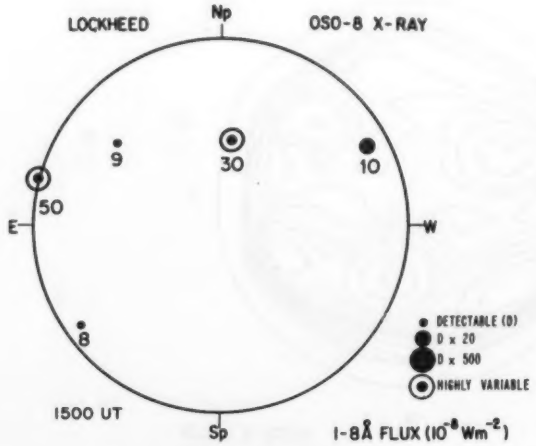


1823 UT

Ant. Temp. Unit 100°K

APRIL 7, 1978 (P = -26.33, B_o = -6.19, L_o = 35.60)

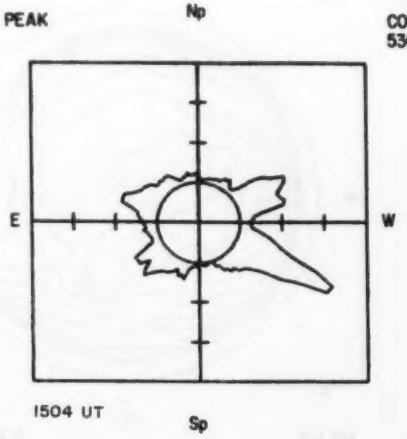
LOCKHEED OSO-8 X-RAY



1500 UT

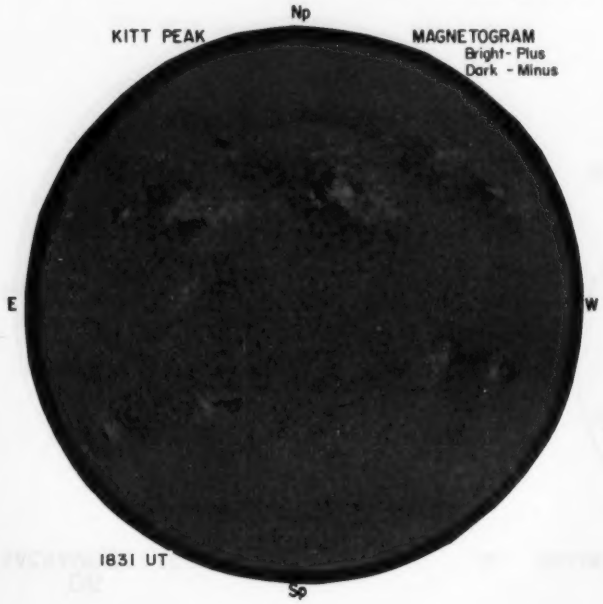
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK



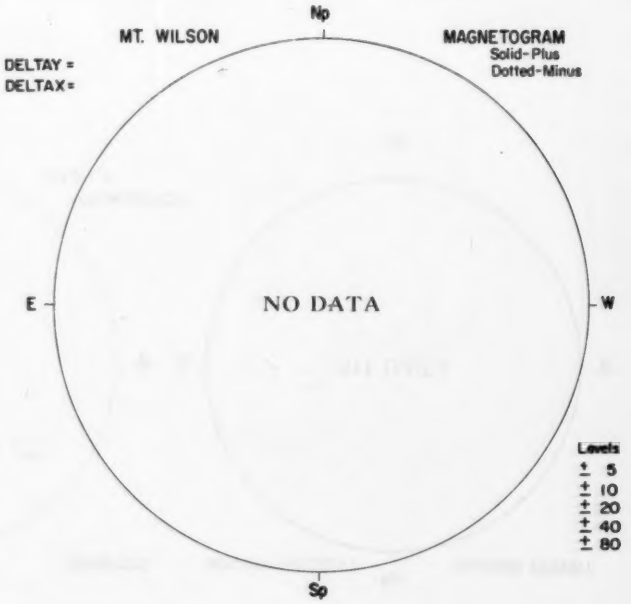
1504 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



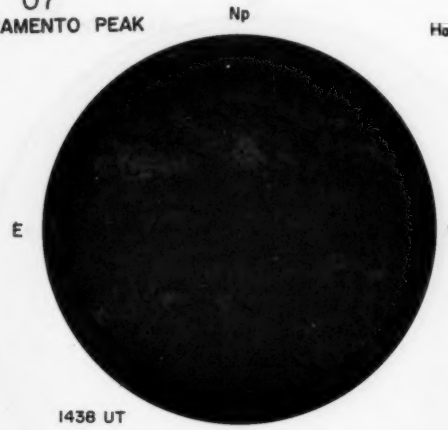
1831 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =



07

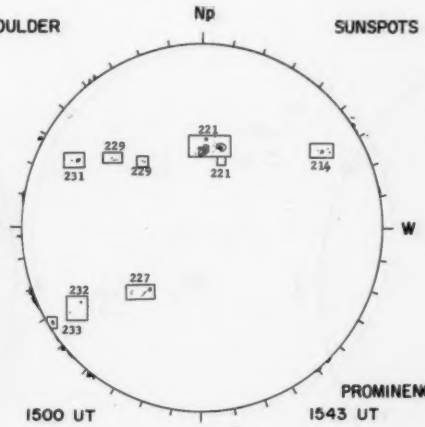
SACRAMENTO PEAK



1438 UT

Hα

BOULDER



1500 UT

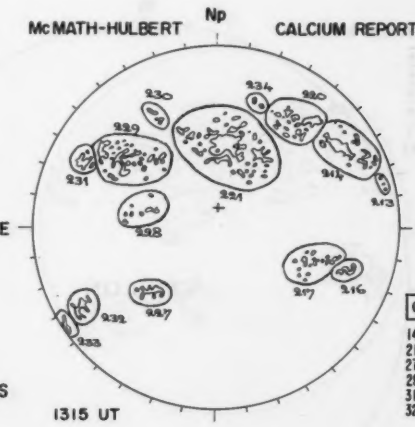
SUNSPOTS

PROMINENCES

1543 UT

McMATH-HULBERT

CALCIUM REPORT

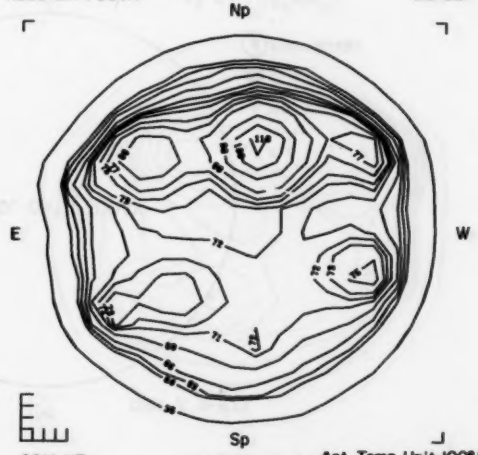


1315 UT

GOOD	S
14 - 2800 - 2.5	
21 - 5000 - 3.5	
27 - 0800 - 3.0	
28 - 3800 - 3.0	
31 - 1200 - 2.5	
32 - 1200 - 2.5	

NOSC LA POSTA

2.0 CM



2011 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

NO DATA

WEATHER

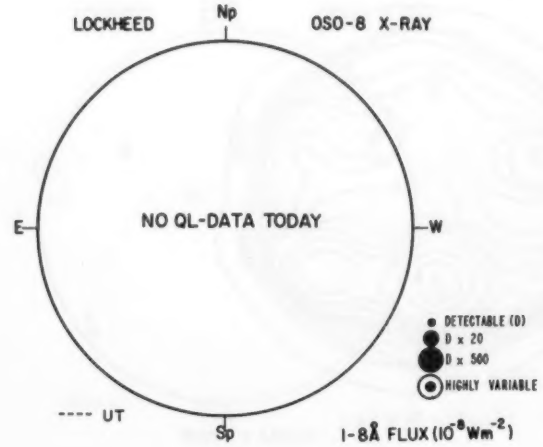
---- UT

Ant. Temp. Unit 100°K

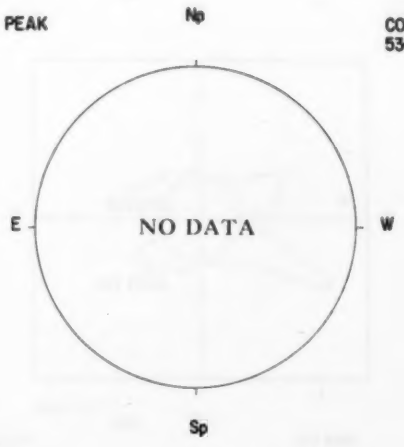
67
Apr 78

APRIL 8, 1978 (P=-26.32, B_o=-6.12, L_o=22.40)

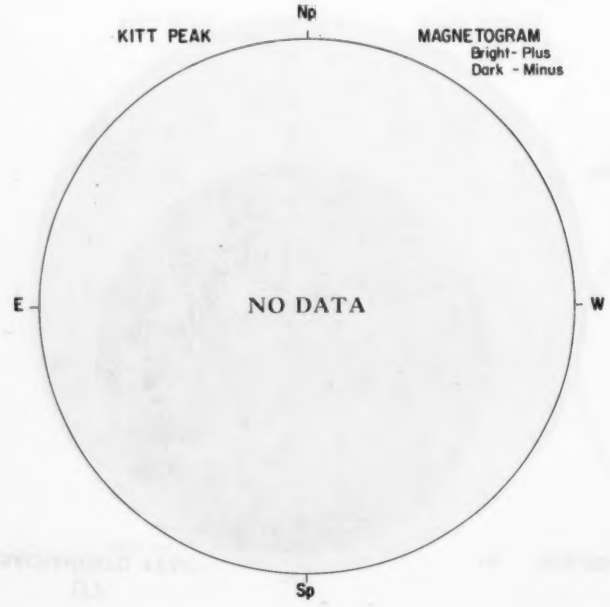
LOCKHEED OSO-8 X-RAY



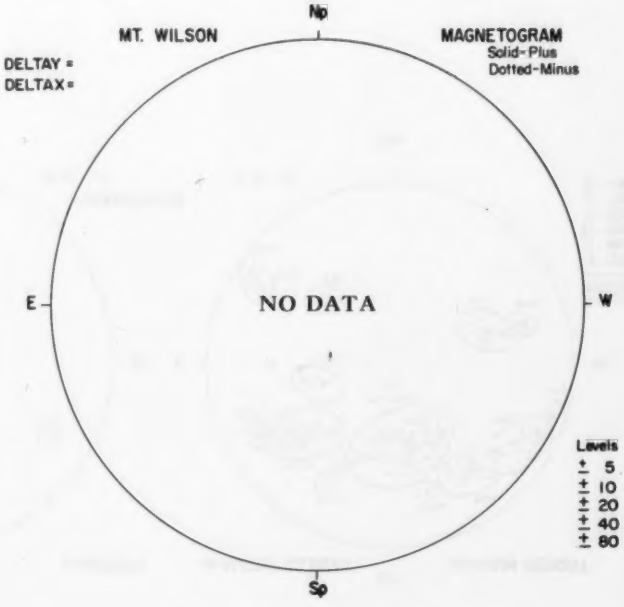
SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

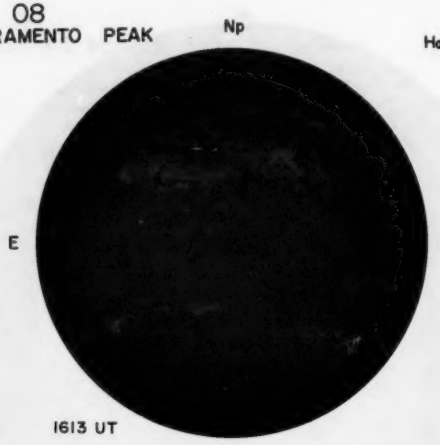


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =



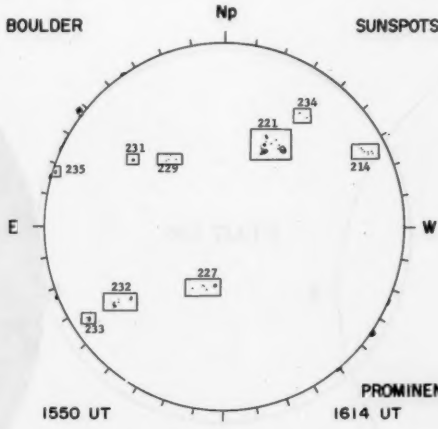
08

SACRAMENTO PEAK



1613 UT

Hα BOULDER



1550 UT

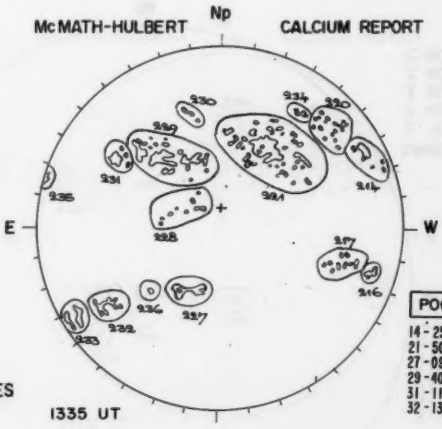
SUNSPOTS

PROMINENCES

1614 UT

McMATH-HULBERT

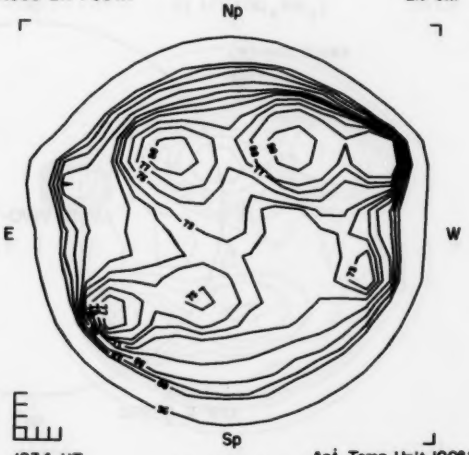
CALCIUM REPORT



POOR	S
14 - 2500	3.0
21 - 5000	3.0
27 - 0900	2.5
29 - 4000	3.0
31 - 1100	3.0
32 - 1300	3.0

1335 UT

NOSC LA POSTA 2.0 CM



1834 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

NO DATA

WEATHER

---- UT

Ant. Temp. Unit 100°K

APRIL 9, 1978 (P=-26.31, B_o=-6.05, L_o=9.21)

LOCKHEED Np OSO-8 X-RAY

NO QL-DATA TODAY

E W

---- UT Sp

DETECTABLE (D)
D x 20
D x 500
HIGHLY VARIABLE

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK Np CORONA (1.15 $R_\odot$) 5303 Å

NO DATA

E W Sp

KITT PEAK Np MAGNETOGRAM Bright - Plus Dark - Minus

E W

1610 UT Sp

MT. WILSON Np MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY =
DELTAX =

NO DATA

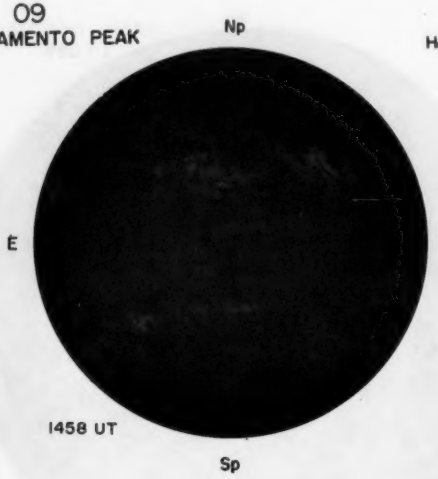
E W

Levels
+ 5
+ + 10
+ + + 20
+ + + 40
+ + + 80

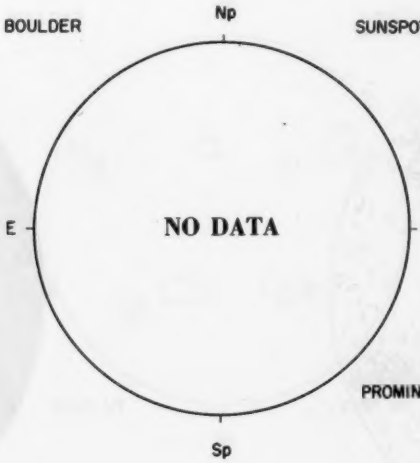
Sp

09

SACRAMENTO PEAK



Hα BOULDER

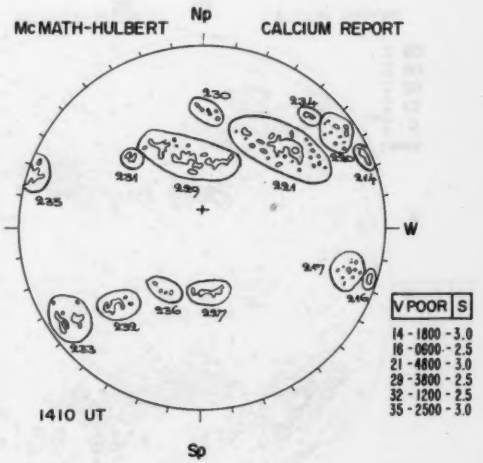


SUNSPOTS

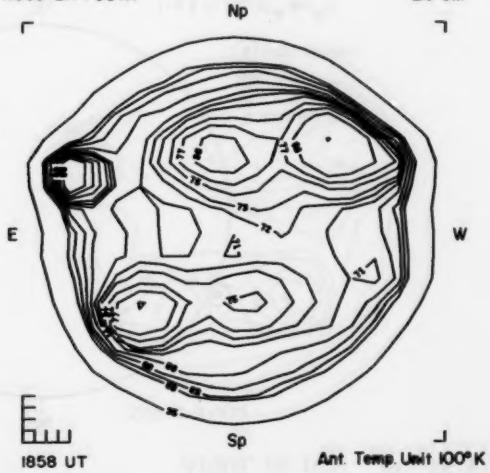
PROMINENCES

McMATH-HULBERT

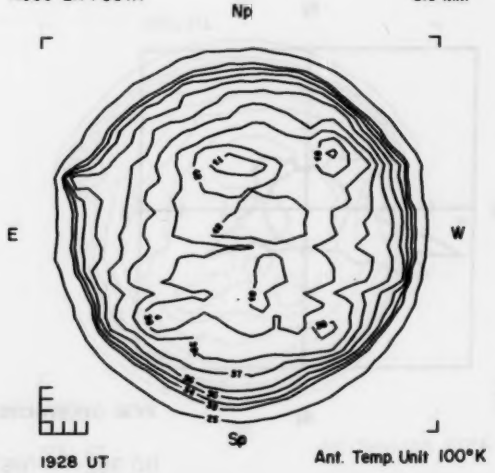
CALCIUM REPORT



NOSC LA POSTA 2.0 CM

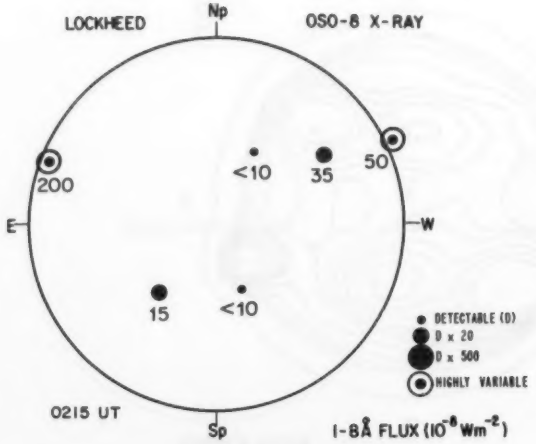


NOSC LA POSTA 8.6 MM



APRIL 10, 1978 (P = -26.30, B_o = - 5.98, L_o = 356.01)

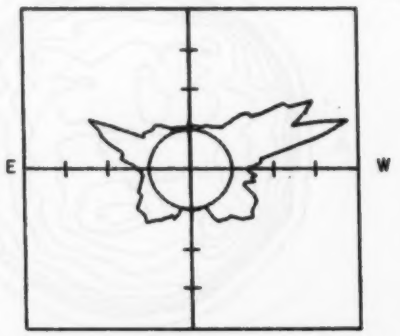
LOCKHEED OSO-8 X-RAY



0215 UT

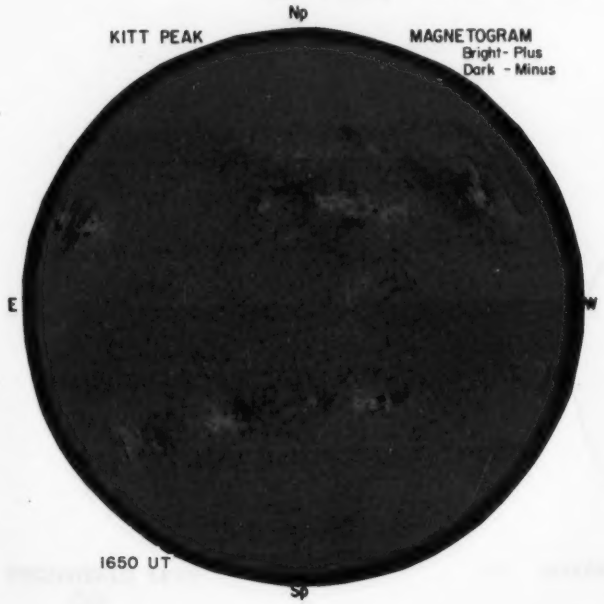
1-8Å FLUX (10^{-6} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



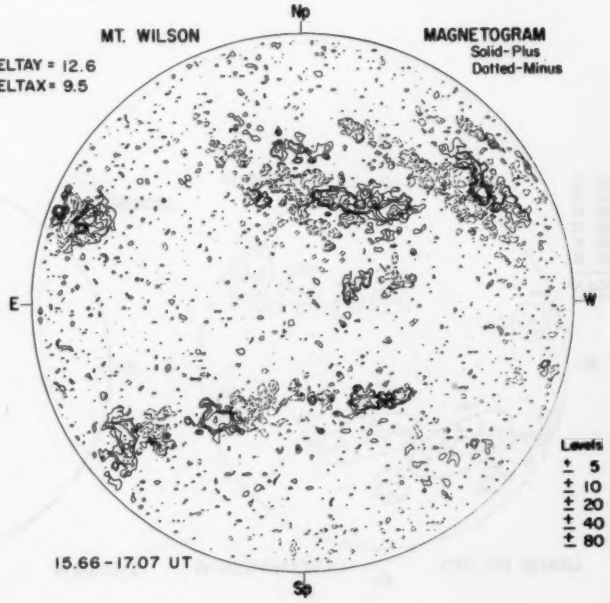
1657 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1650 UT

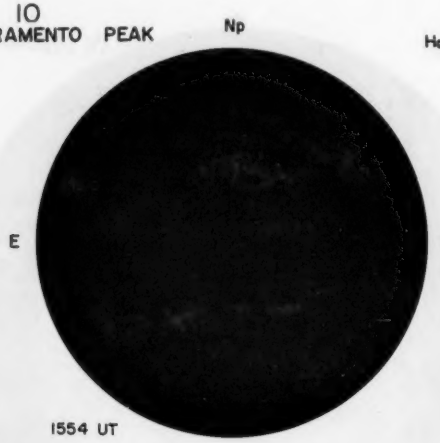
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5



15.66 - 17.07 UT

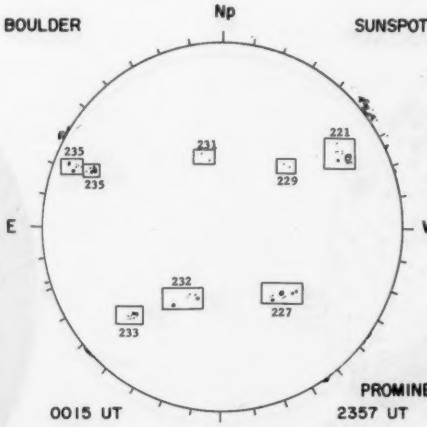
10

SACRAMENTO PEAK



1554 UT

Hα BOULDER



0015 UT

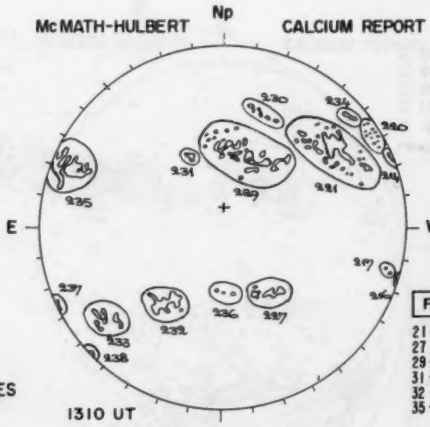
SUNSPOTS

PROMINENCES

2357 UT

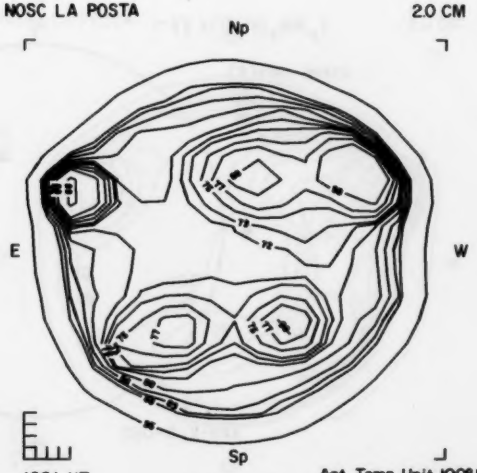
McMATH-HULBERT

CALCIUM REPORT



1310 UT

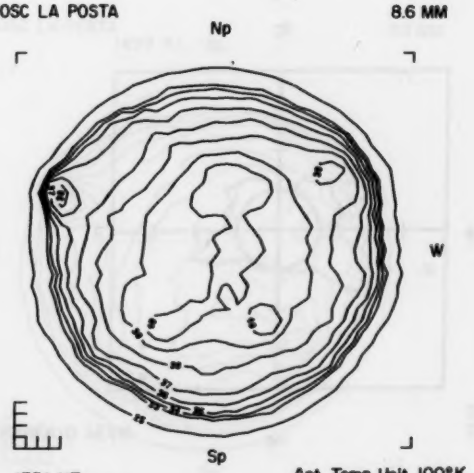
NOSC LA POSTA 2.0 CM



1901 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

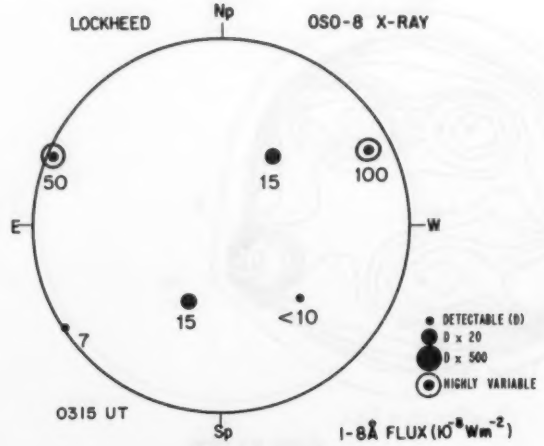


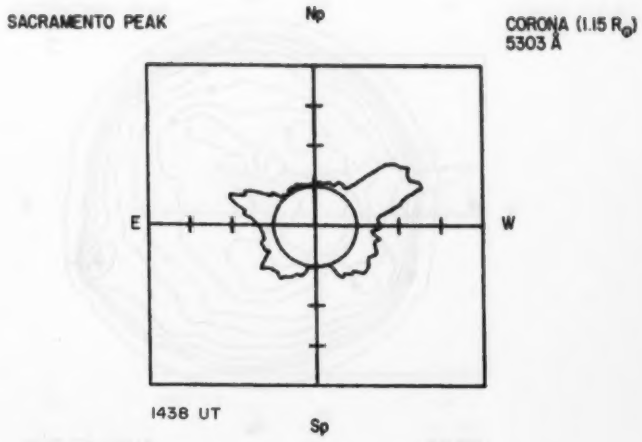
1751 UT

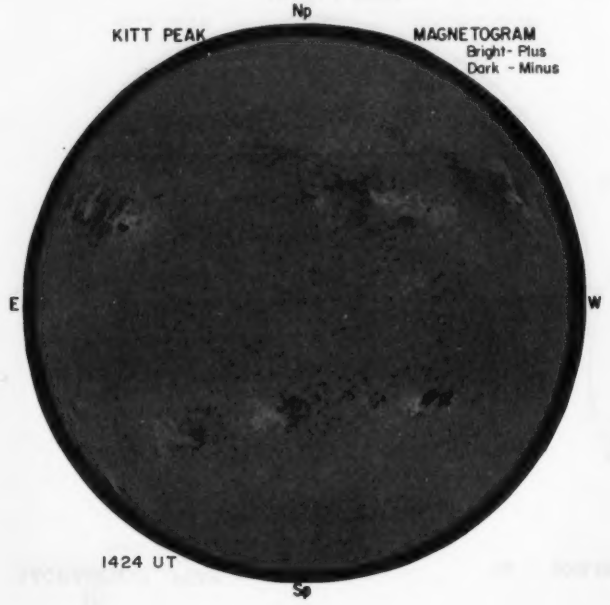
Ant. Temp. Unit 100°K

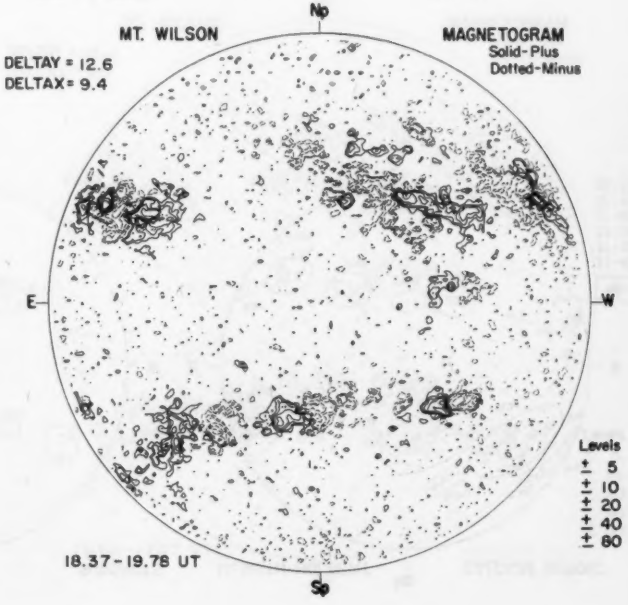
73
Apr 78

APRIL 11, 1978 (P=-26.27, B_o=-5.91, L_o=342.81)

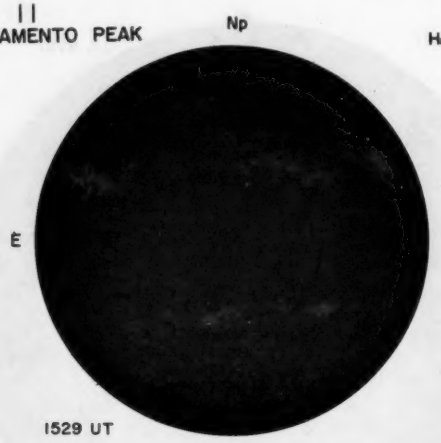






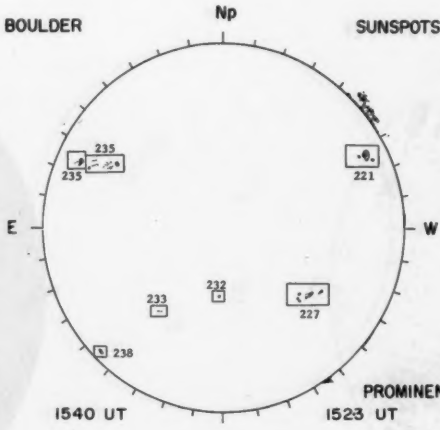


SACRAMENTO PEAK



1529 UT

Hα BOULDER



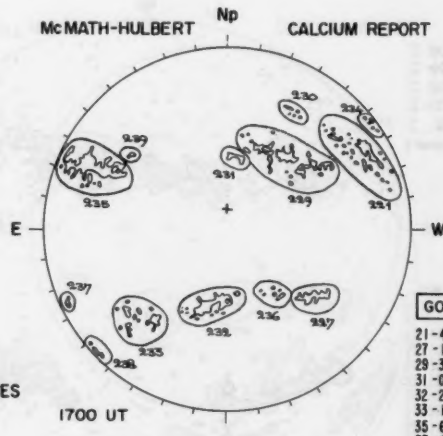
1540 UT

SUNSPOTS

PROMINENCES

1523 UT

McMATH-HULBERT

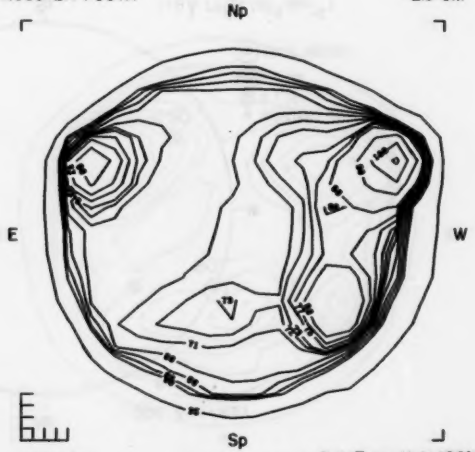


1700 UT

CALCIUM REPORT

GOOD	S
21 - 4500 - 3.5	
27 - 1400 - 3.0	
29 - 3800 - 3.0	
31 - 0500 - 2.5	
32 - 2000 - 2.5	
33 - 1800 - 2.5	
35 - 6200 - 3.5	
37 - 0900 - 3.0	
38 - 0700 - 3.0	
39 - 0200 - 2.5	

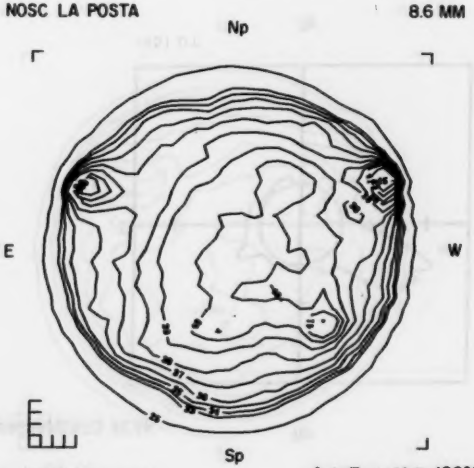
NOSC LA POSTA 2.0 CM



2056 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

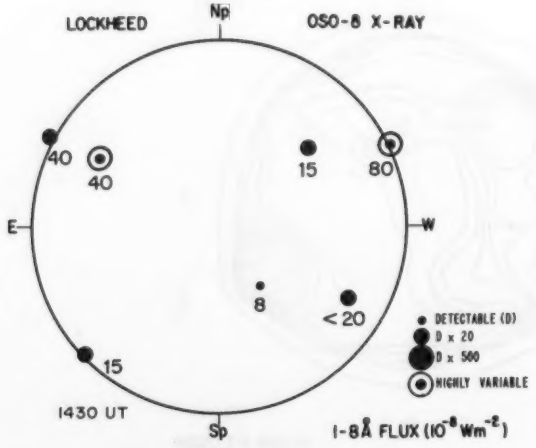


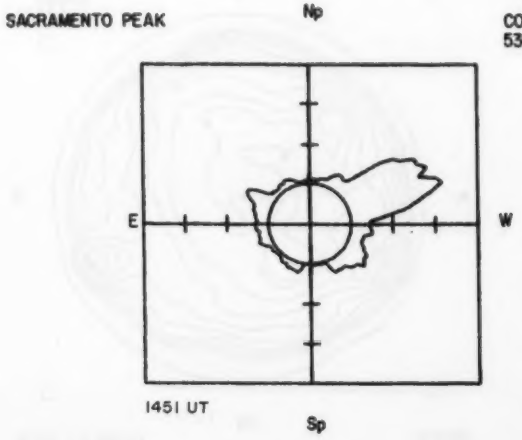
1934 UT

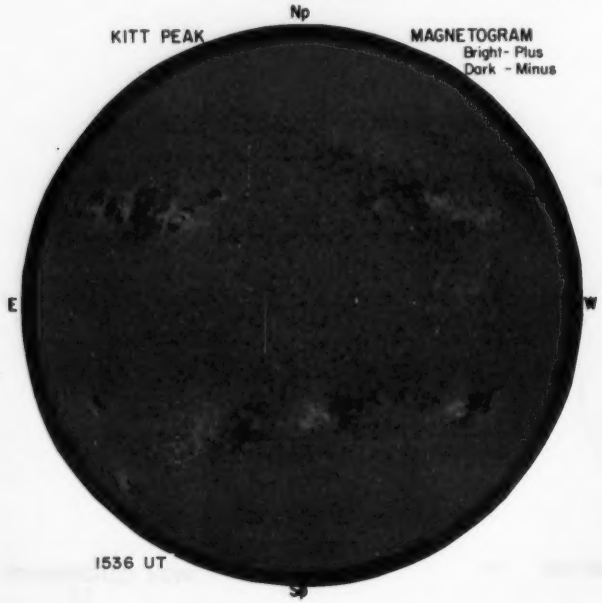
Ant. Temp. Unit 100°K

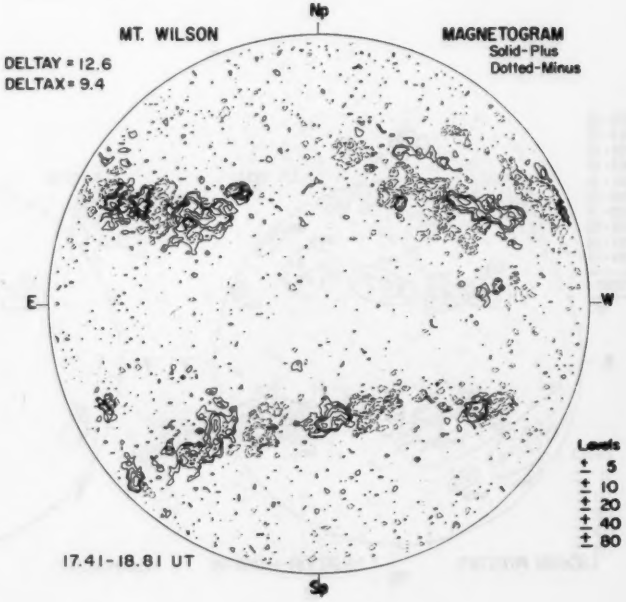
75
Apr 78

APRIL 12, 1978 (P = -26.24, B_o = -5.84, L_o = 329.61)



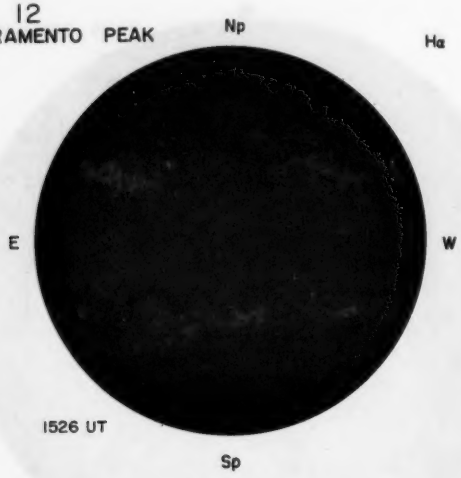




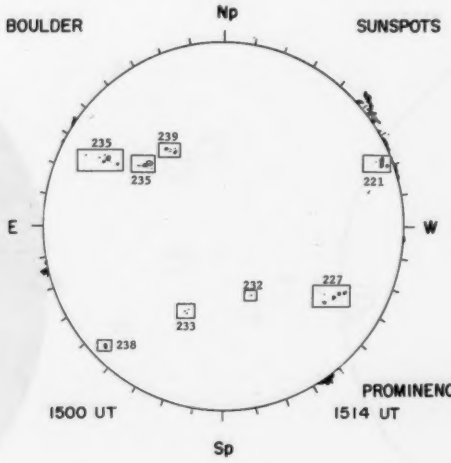


12

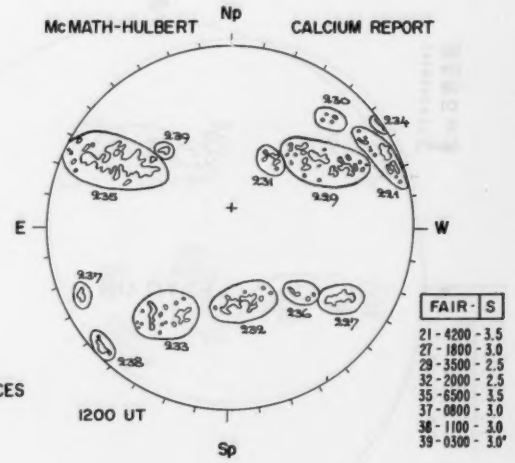
SACRAMENTO PEAK



Hα BOULDER



SUNSPOTS



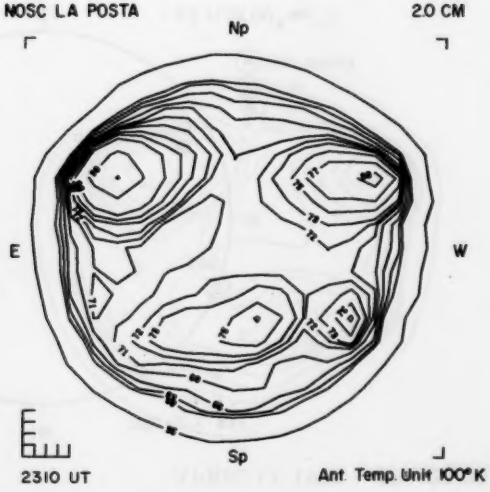
McMATH-HULBERT

CALCIUM REPORT

PROMINENCES

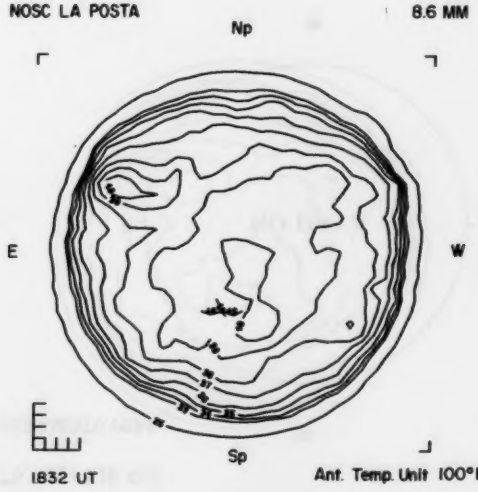
1514 UT

NOSC LA POSTA 2.0 CM



Ant. Temp. Unit 100°K

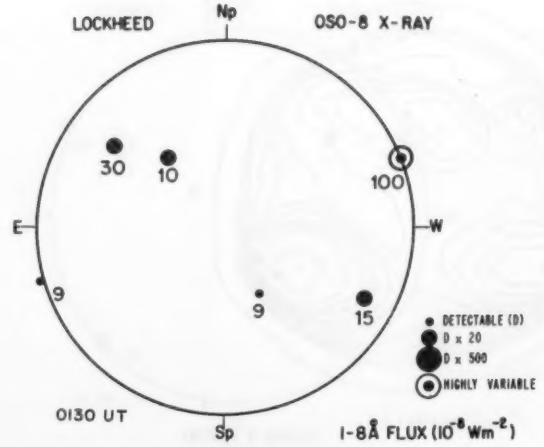
NOSC LA POSTA 8.6 MM

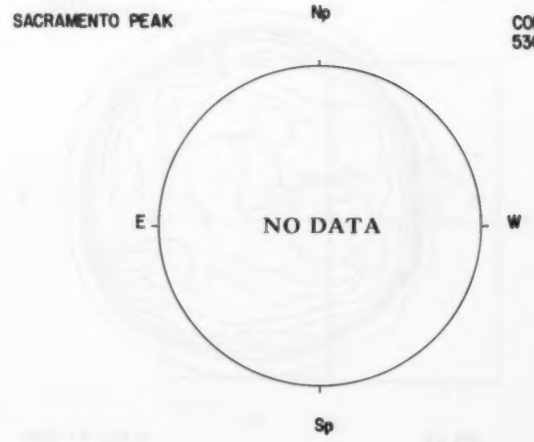


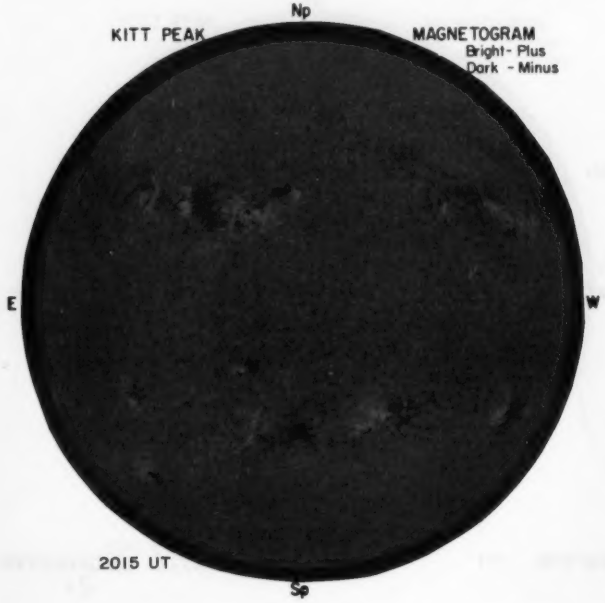
Ant. Temp. Unit 100°K

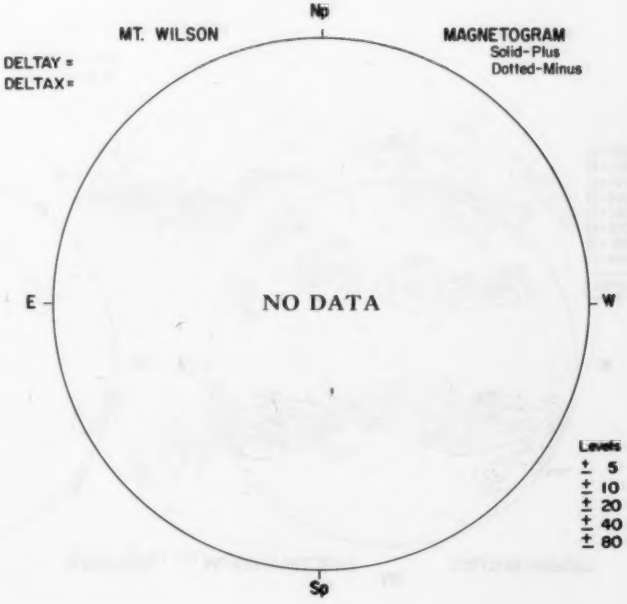
77
Apr 78

APRIL 13, 1978 (P=-26.20, B_o=-5.76, L_o=316.40)



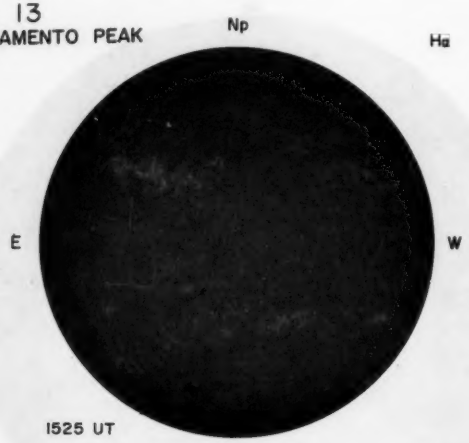






13

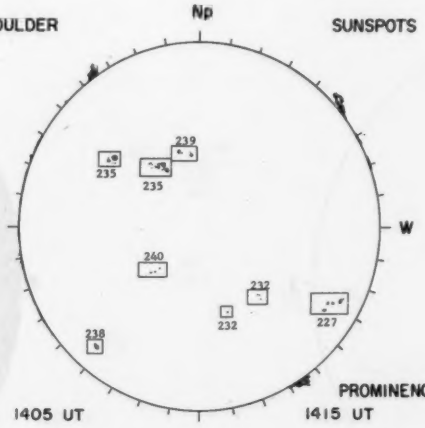
SACRAMENTO PEAK



Hα

1525 UT

BOULDER



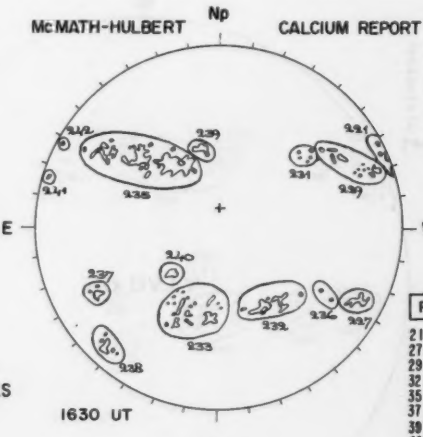
SUNSPOTS

1405 UT

PROMINENCES

1415 UT

McMATH-HULBERT



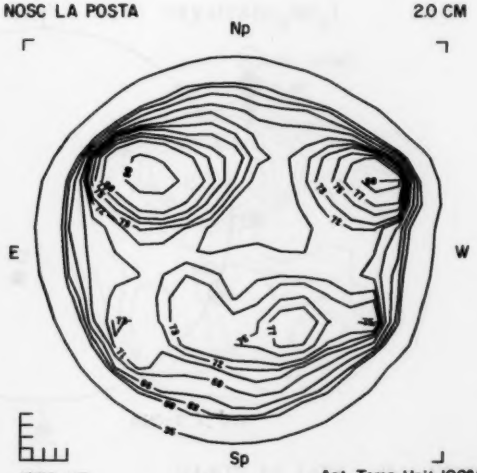
1630 UT

CALCIUM REPORT

POOR	S
21 - 1800 - 2.5	
27 - 1600 - 3.0	
29 - 3100 - 2.5	
32 - 2000 - 3.0	
35 - 6000 - 3.0	
37 - 0700 - 3.0	
39 - 0500 - 3.0	
40 - 0400 - 3.0	

NOSC LA POSTA

2.0 CM

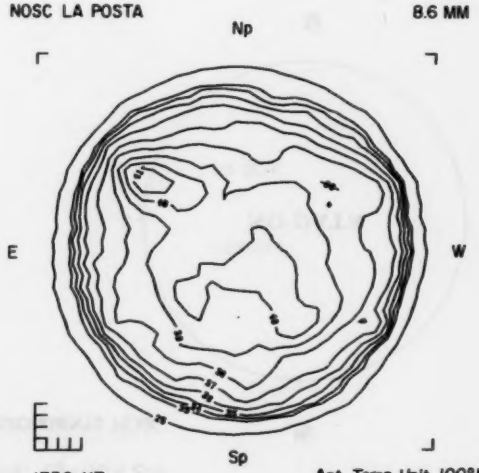


1836 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



1736 UT

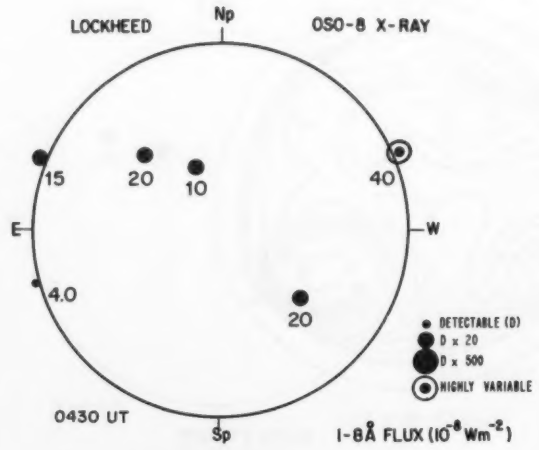
Ant. Temp. Unit 100°K

79

Apr 78

APRIL 14, 1978 (P = -26.16, B_0 = -5.69, L_0 = 303.20)

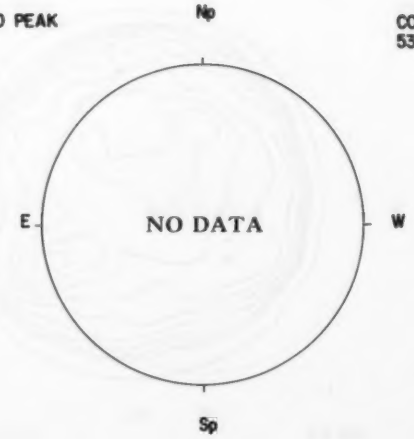
LOCKHEED OSO-8 X-RAY



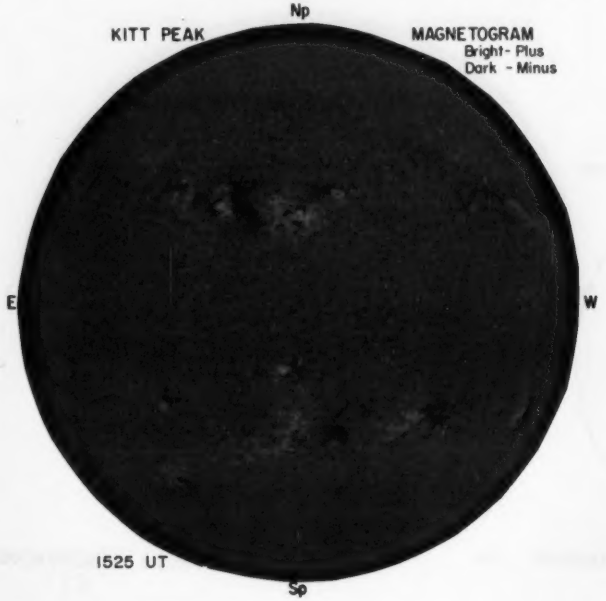
0430 UT

1-8Å FLUX (10^{-6} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



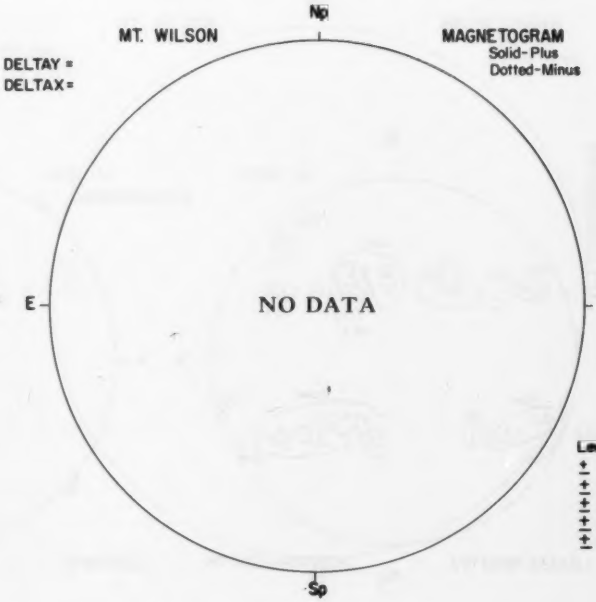
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1525 UT

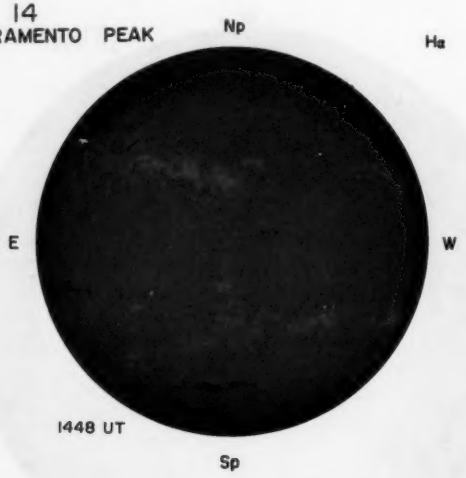
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



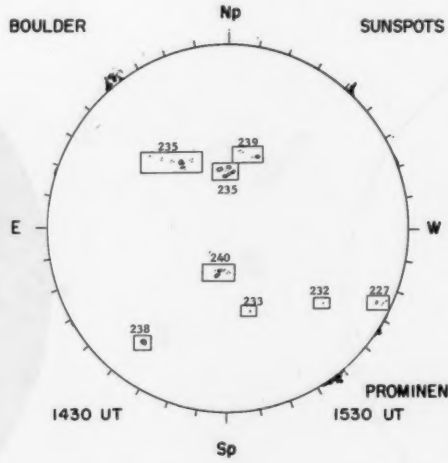
14

SACRAMENTO PEAK



1448 UT

BOULDER



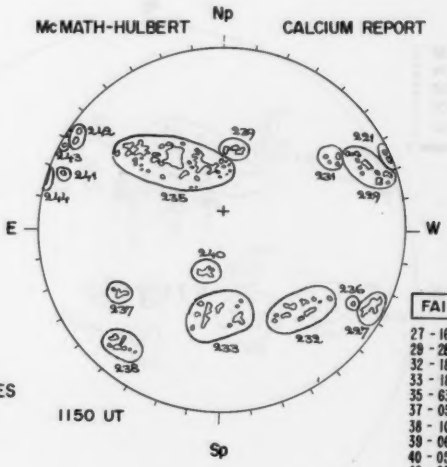
1430 UT

SUNSPOTS

PROMINENCES

1530 UT

McMATH-HULBERT



1150 UT

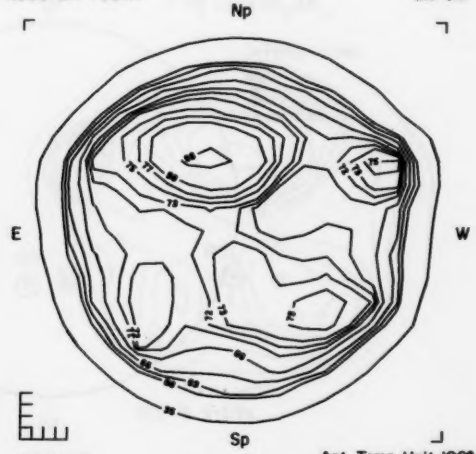
CALCIUM REPORT

FAIR | D

27 - 1600 - 3.5
29 - 2800 - 2.5
32 - 1800 - 3.0
33 - 1800 - 2.5
35 - 6300 - 3.5
37 - 0500 - 3.0
38 - 1000 - 2.5
39 - 0600 - 3.0
40 - 0500 - 3.0
42 - 0500 - 2.5

NOSC LA POSTA

20 CM



2051 UT

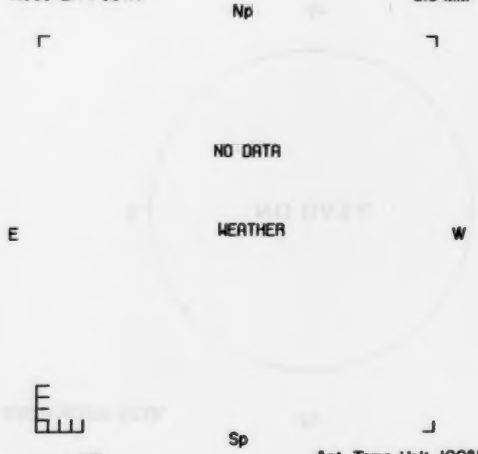
Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

NO DATA

WEATHER



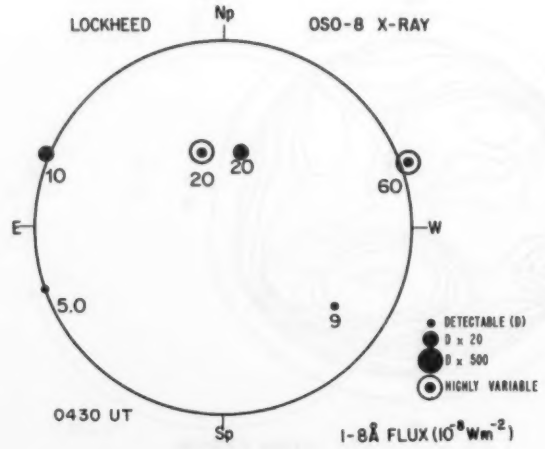
---- UT

Ant. Temp. Unit 100°K

81
Apr 78

APRIL 15, 1978 (P=-26.10, B_o=-5.61, L_o=290.00)

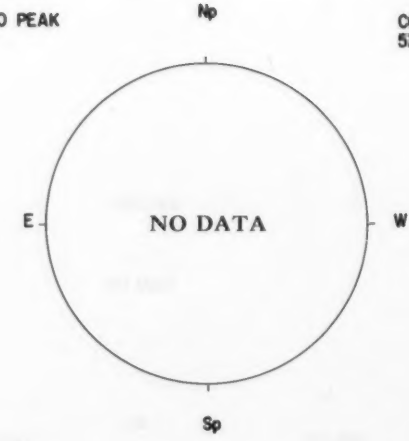
LOCKHEED OSO-8 X-RAY



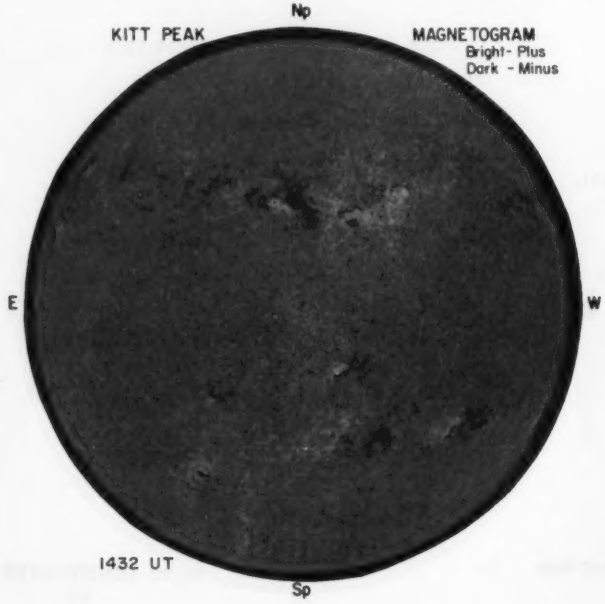
0430 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



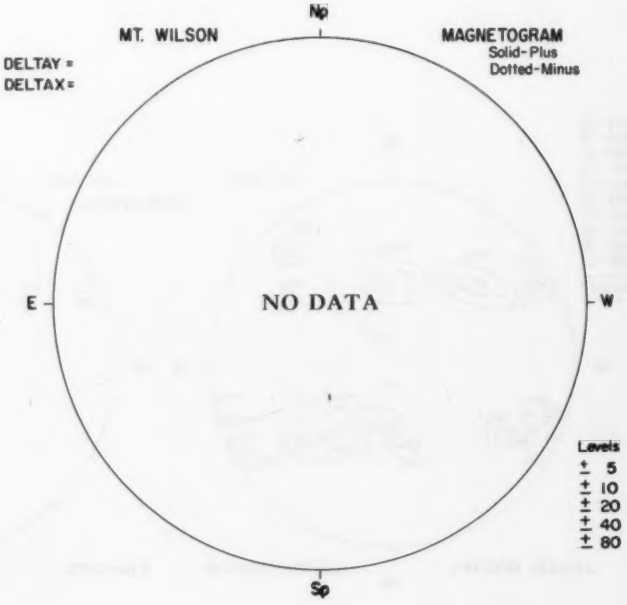
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1432 UT

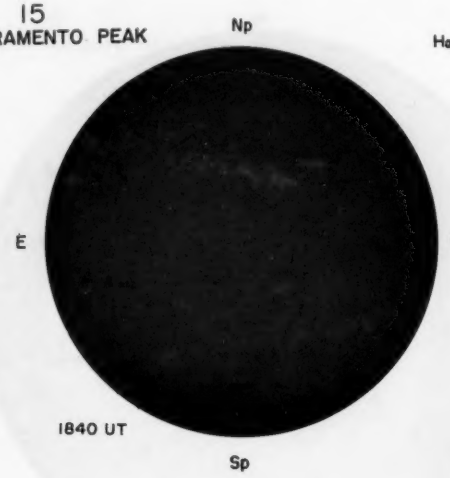
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



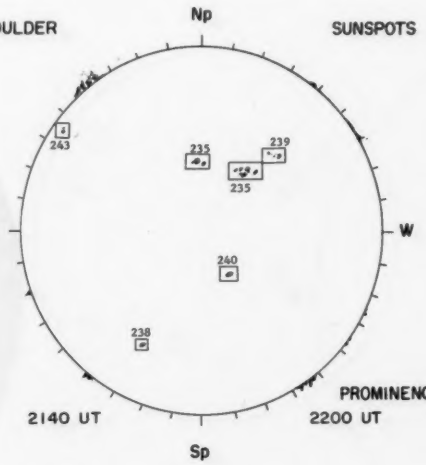
15

SACRAMENTO PEAK



Ha

BOULDER

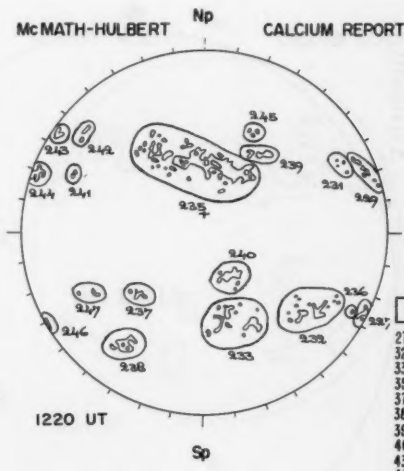


SUNSPOTS

PROMINENCES

McMATH-HULBERT

CALCIUM REPORT

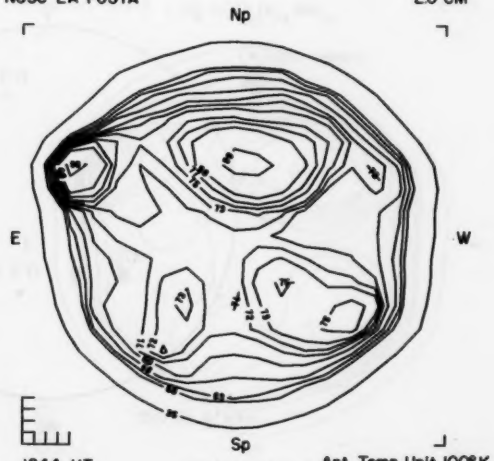


FAIR | S

27 - 1400 - 3.0
32 - 1800 - 3.0
33 - 2000 - 2.5
35 - 6500 - 3.5
37 - 0500 - 2.5
38 - 1000 - 2.5
39 - 0700 - 3.0
40 - 0700 - 2.5
43 - 0800 - 3.5
44 - 1200 - 2.5
46 - 0700 - 2.5

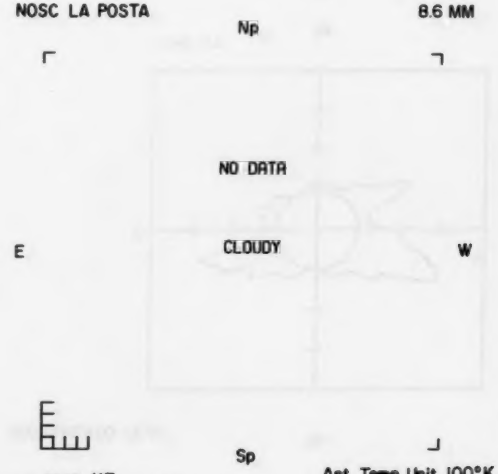
NOSC LA POSTA

20 CM



NOSC LA POSTA

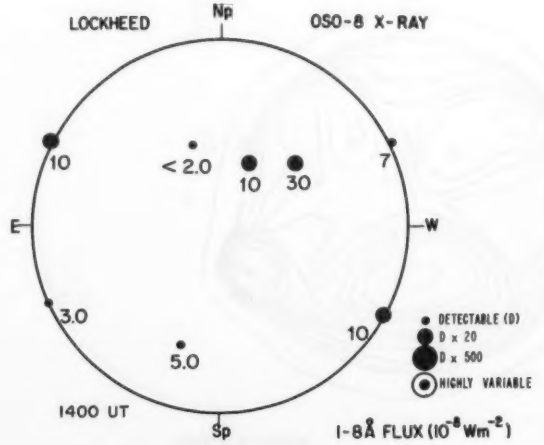
8.6 MM



83
Apr 78

APRIL 16, 1978 (P=-26.04, B_o=-5.53, L_o=276.79)

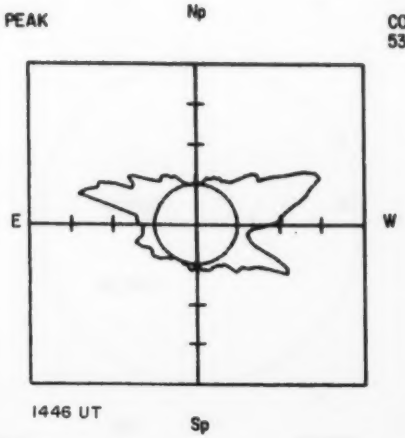
LOCKHEED OSO-8 X-RAY



1400 UT

1-8Å FLUX (10^{-8} Wm^{-2})

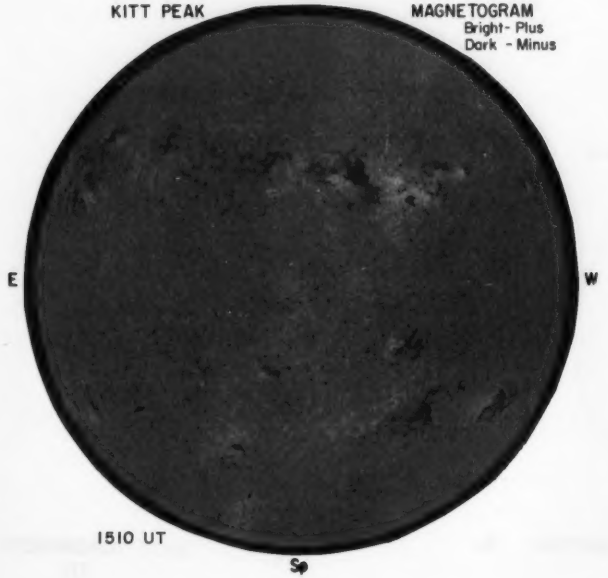
SACRAMENTO PEAK



1446 UT

KITT PEAK MAGNETOGRAM

Bright - Plus
Dark - Minus

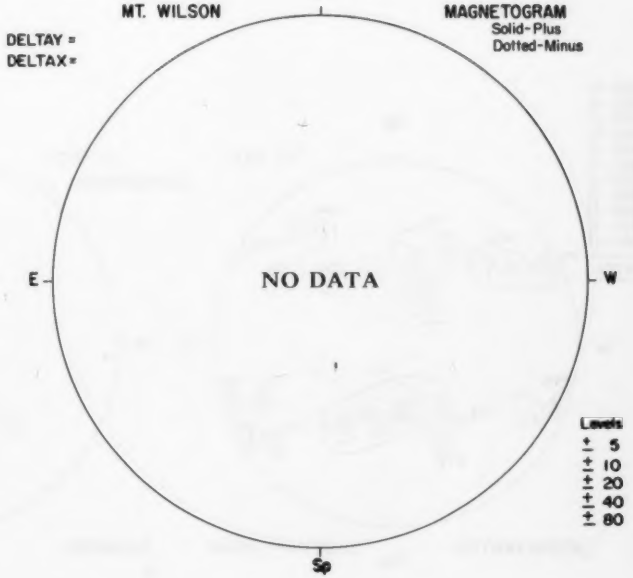


1510 UT

MT. WILSON MAGNETOGRAM

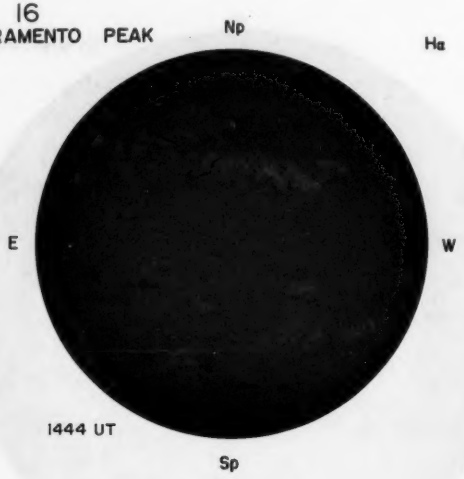
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

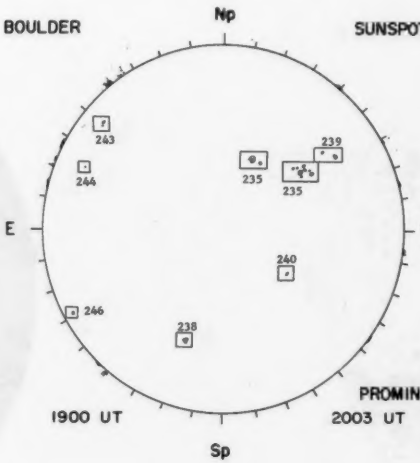


16

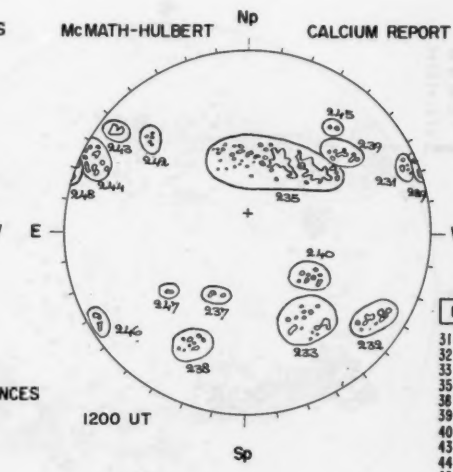
SACRAMENTO PEAK



Hα BOULDER



SUNSPOTS

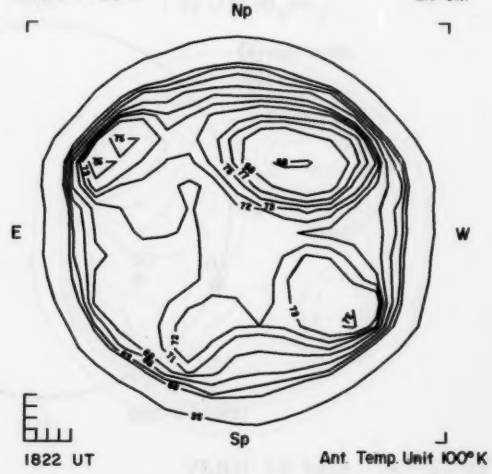


McMATH-HULBERT

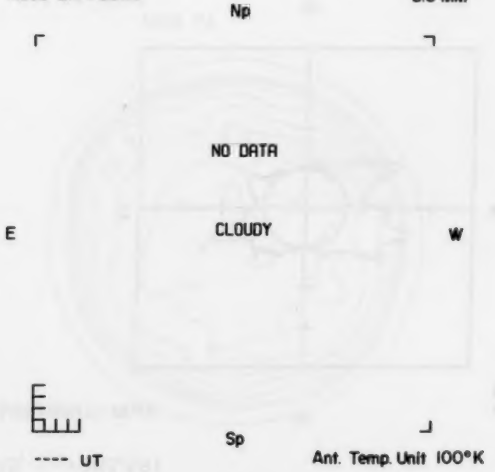
CALCIUM REPORT

FAIR	D
31 - 0300 - 3.0	
32 - 1500 - 3.0	
33 - 1800 - 2.5	
35 - 6300 - 3.5	
38 - 0800 - 2.5	
39 - 0700 - 3.0	
40 - 0600 - 2.5	
43 - 1200 - 3.5	
44 - 1800 - 3.0	
46 - 0700 - 2.5	

NOSC LA POSTA 2.0 CM

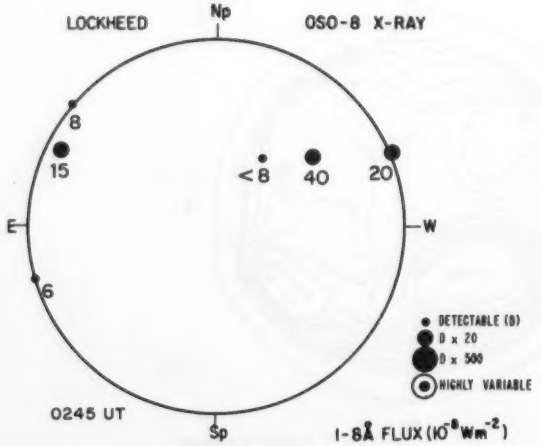


NOSC LA POSTA 8.6 MM



APRIL 17, 1978 (P=-25.97, B_o=-5.45, L_o=263.59)

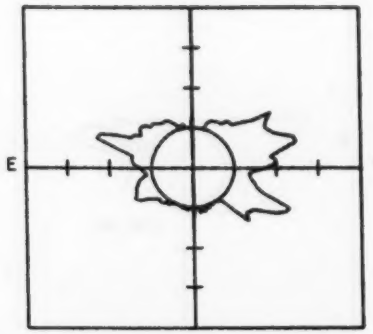
LOCKHEED OSO-8 X-RAY



0245 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

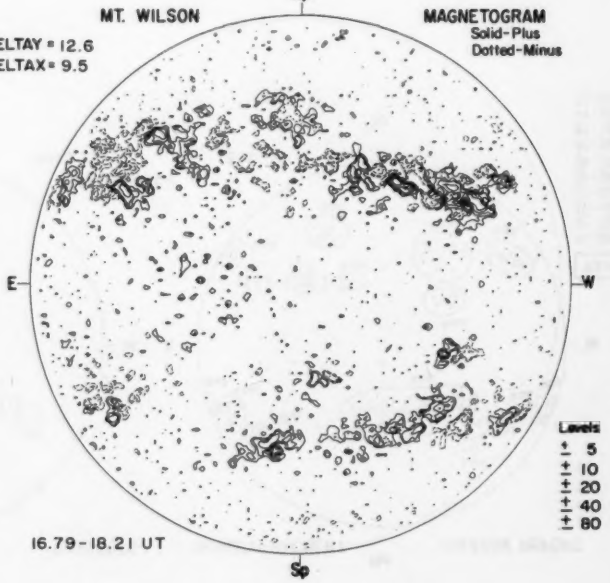


1422 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

1414 UT

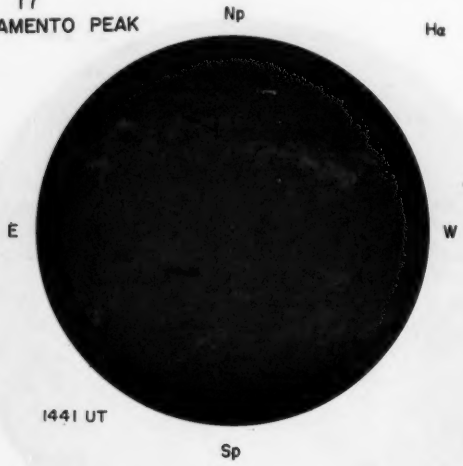
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5



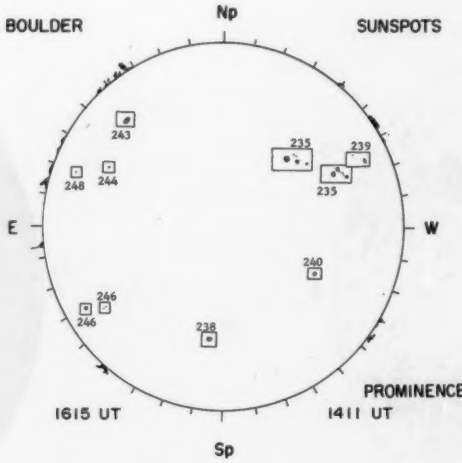
16.79 - 18.21 UT

17

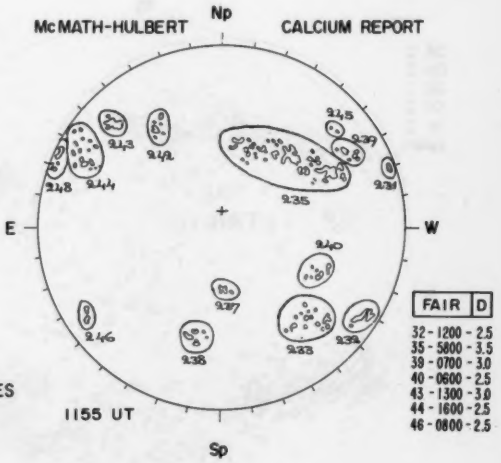
SACRAMENTO PEAK



Hα BOULDER



SUNSPOTS



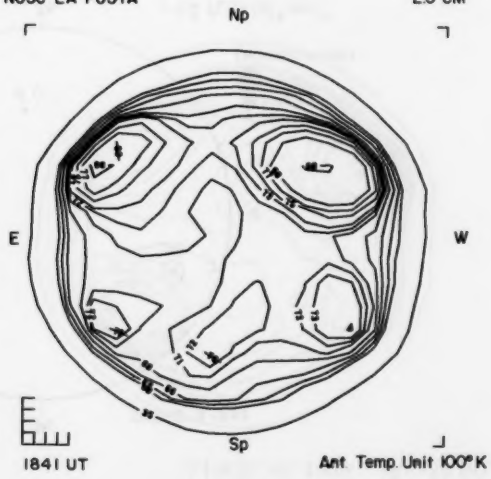
McMATH-HULBERT

CALCIUM REPORT

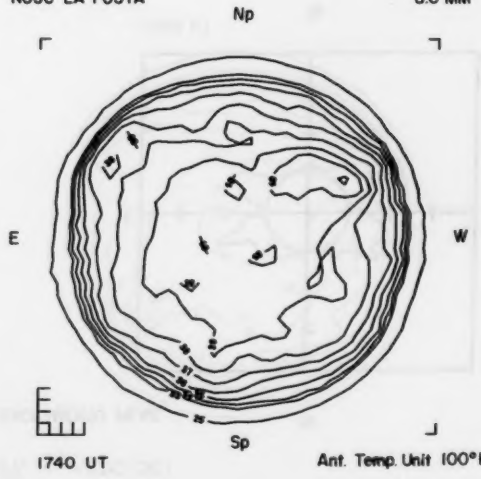
FAIR D

32 - 1200 - 2.5
35 - 5800 - 3.5
39 - 0700 - 3.0
40 - 0600 - 2.5
43 - 1300 - 3.0
44 - 1600 - 2.5
46 - 0800 - 2.5

NOSC LA POSTA 2.0 CM



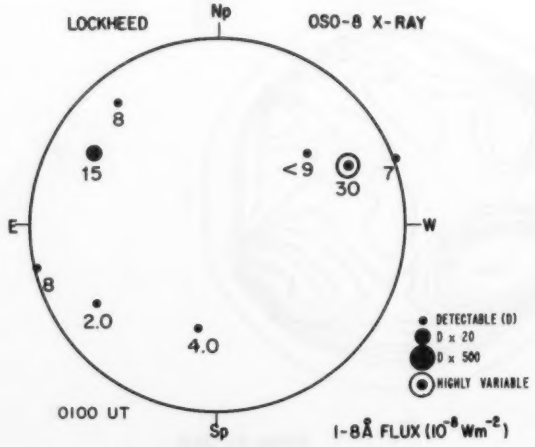
NOSC LA POSTA 8.6 MM



87
Apr 78

APRIL 18, 1978 (P =-25.90, B_o =-5.37, L_o = 250.38)

LOCKHEED OSO-8 X-RAY

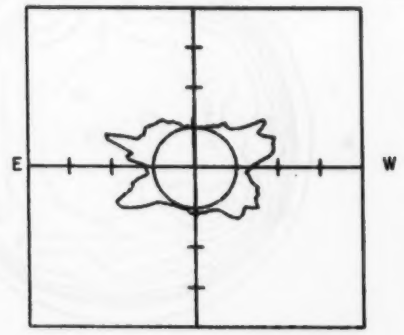


0100 UT

1-8Å FLUX (10^{-8} Wm^{-2})

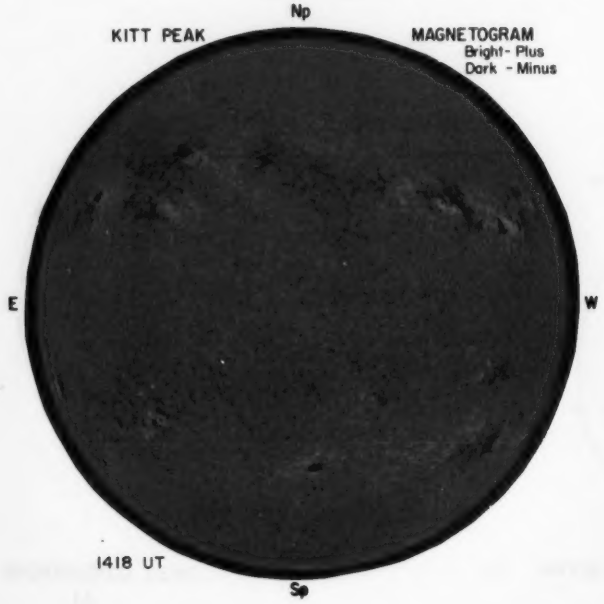
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1409 UT

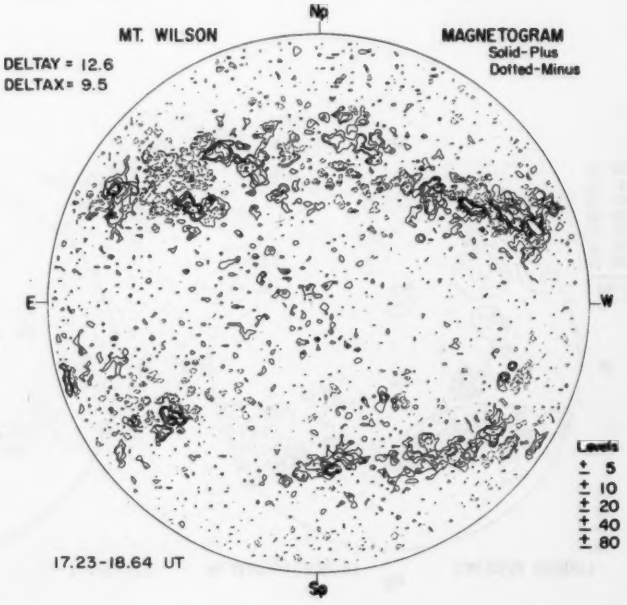
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1418 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

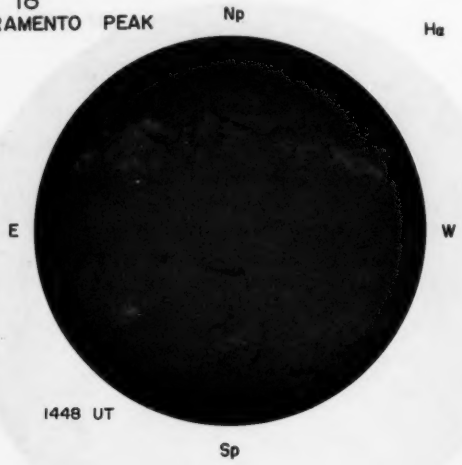
DELTAY = 12.6
DELTAX = 9.5



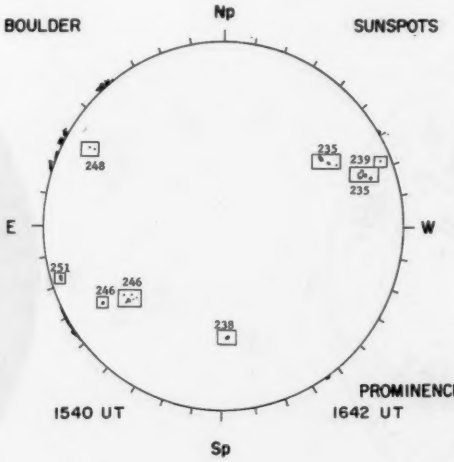
17.23-18.64 UT

18

SACRAMENTO PEAK

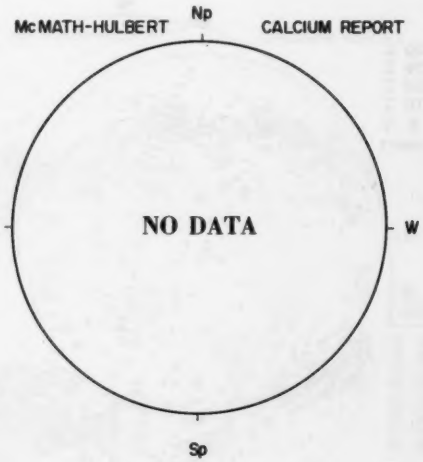


Hα BOULDER



SUNSPOTS

McMATH-HULBERT

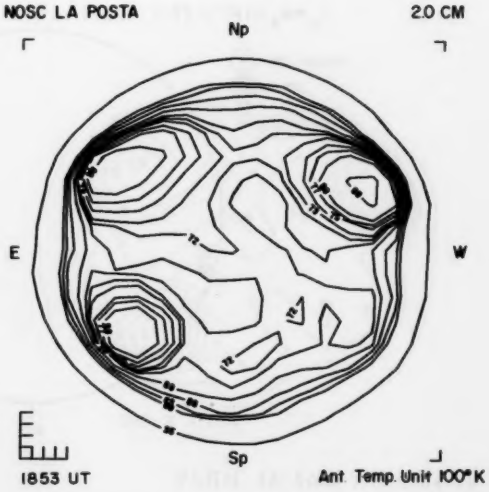


CALCIUM REPORT

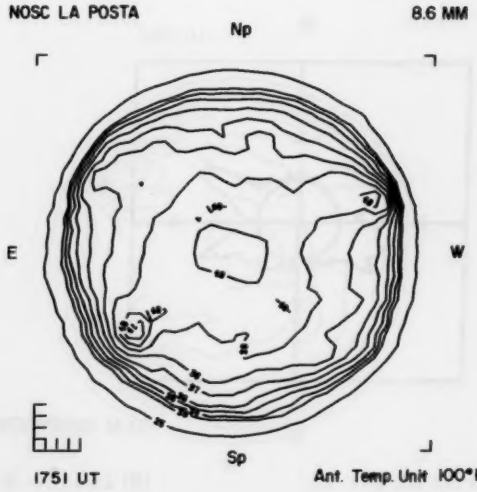
PROMINENCES

1642 UT

NOSC LA POSTA 2.0 CM

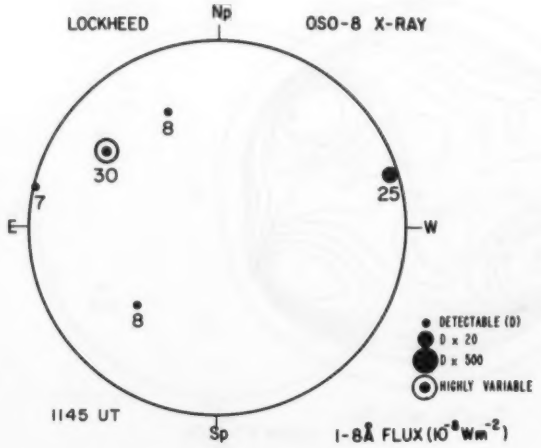


NOSC LA POSTA 8.6 MM



APRIL 19, 1978 (P = -25.81, B_o = -5.28, L_o = 237.18)

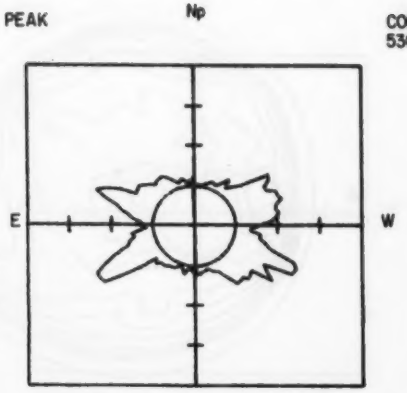
LOCKHEED OSO-8 X-RAY



1145 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

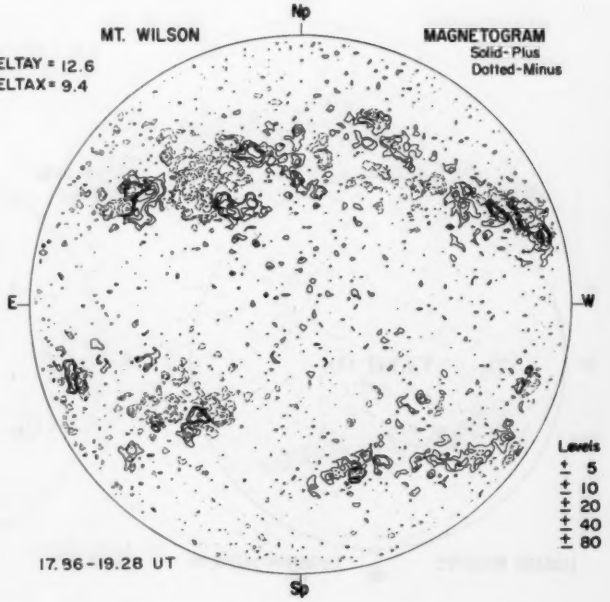


1706 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

1541 UT

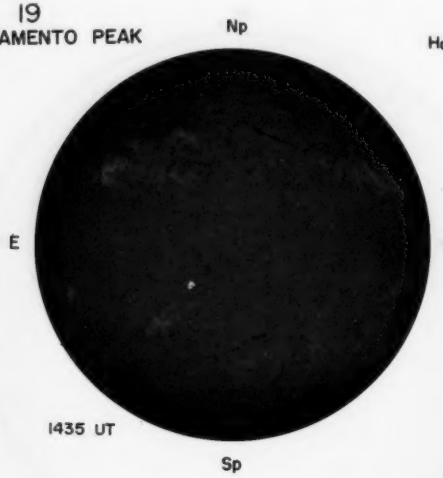
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.4



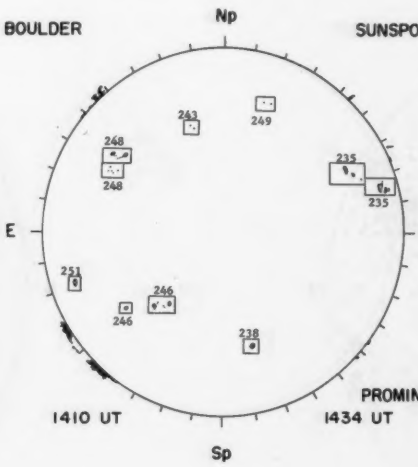
17.96 - 19.28 UT

19

SACRAMENTO PEAK



Hα BOULDER

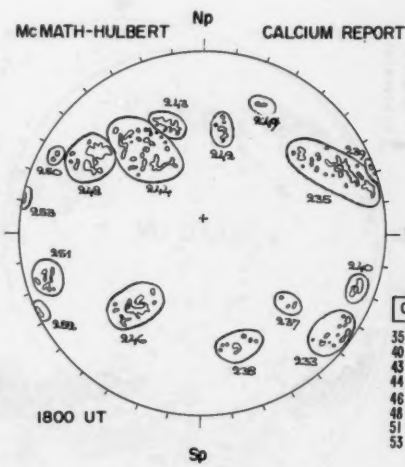


SUNSPOTS

PROMINENCES

1434 UT

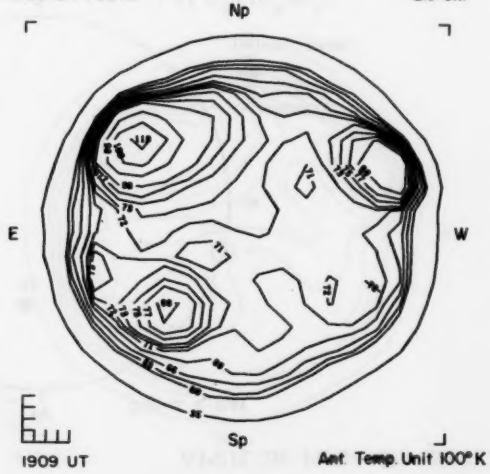
McMATH-HULBERT



CALCIUM REPORT

GOOD	S
35 - 5400 - 3.5	
40 - 0800 - 3.0	
43 - 1300 - 3.0	
44 - 2500 - 3.0	
46 - 1200 - 2.5	
48 - 3000 - 3.5	
51 - 1200 - 3.5	
53 - 0800 - 2.5	

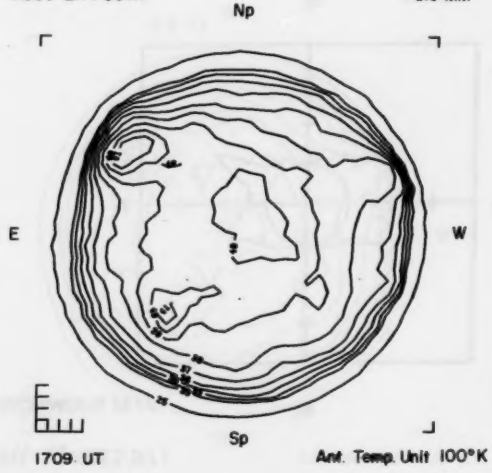
NOSC LA POSTA 2.0 CM



1909 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

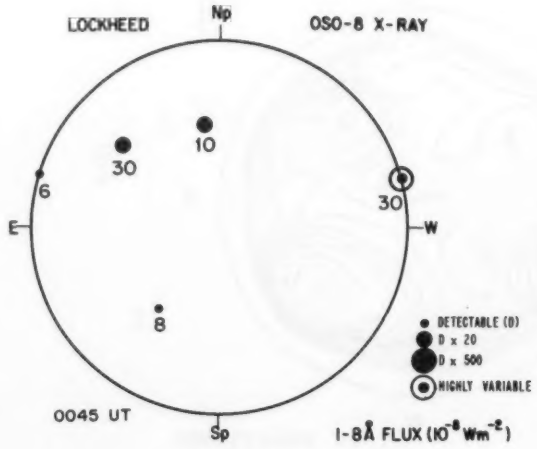


1709 UT

Ant. Temp. Unit 100°K

APRIL 20, 1978 (P=-25.72, B_o=-5.20, L_o=223.97)

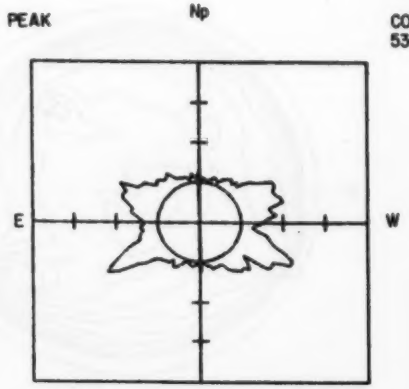
LOCKHEED OSO-8 X-RAY



0045 UT

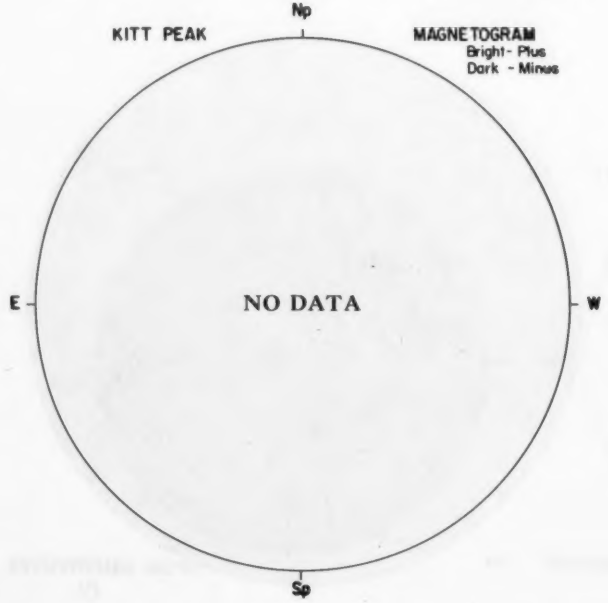
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



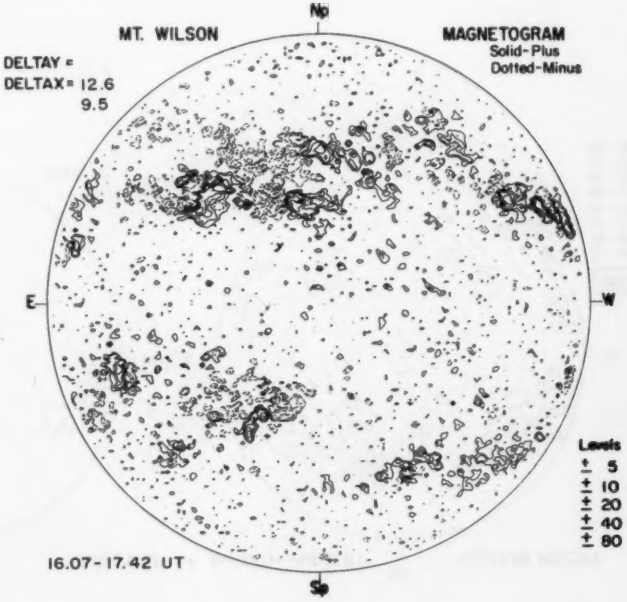
1418 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

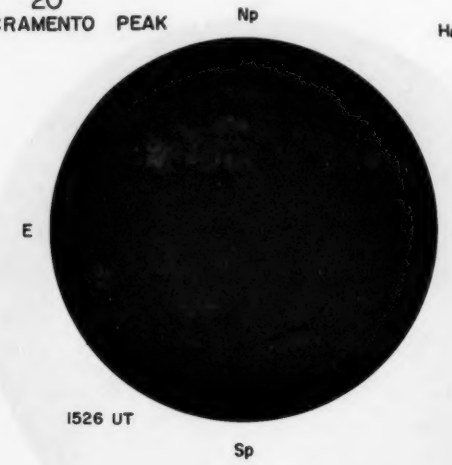
DELTAY =
DELTAX = 12.6
9.5



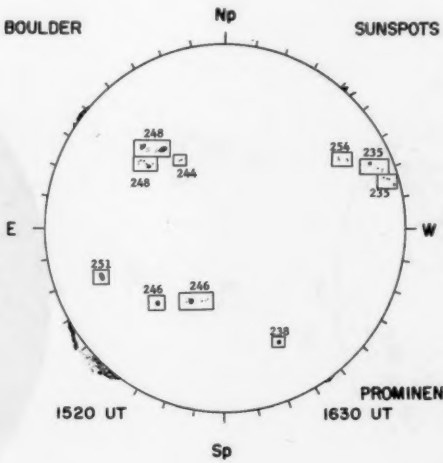
16.07 - 17.42 UT

20

SACRAMENTO PEAK



Hα BOULDER



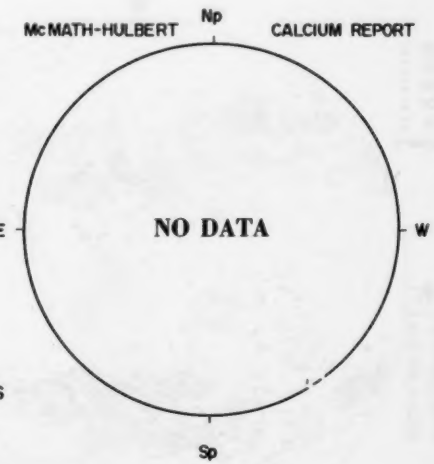
SUNSPOTS

PROMINENCES

1630 UT

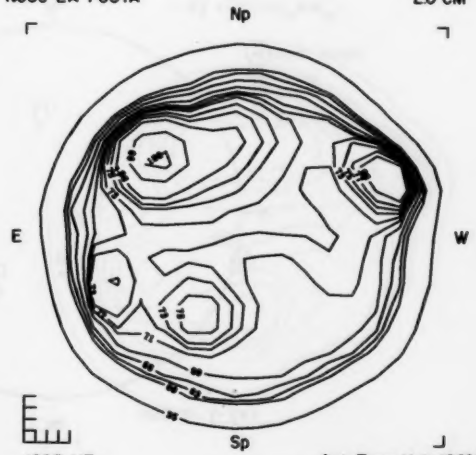
McMATH-HULBERT

CALCIUM REPORT



NOSC LA POSTA

2.0 CM



1823 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

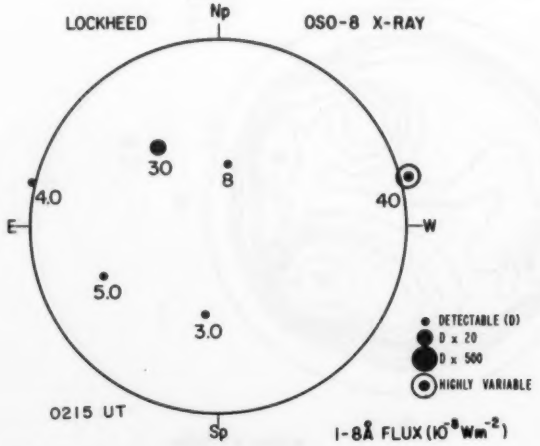
8.6 MM

1720 UT

Ant. Temp. Unit 100°K

APRIL 21, 1978 (P=-25.62, B_o=-5.11, L_o=210.76)

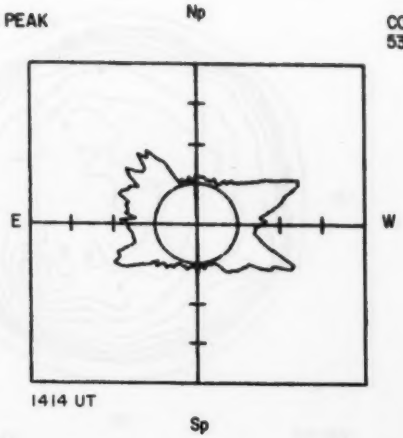
LOCKHEED OSO-8 X-RAY



0215 UT

1-8Å FLUX (10^{-8} Wm^{-2})

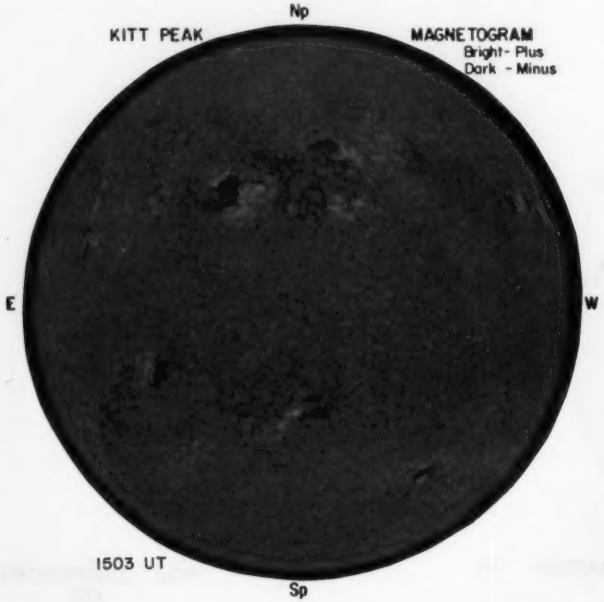
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

1414 UT

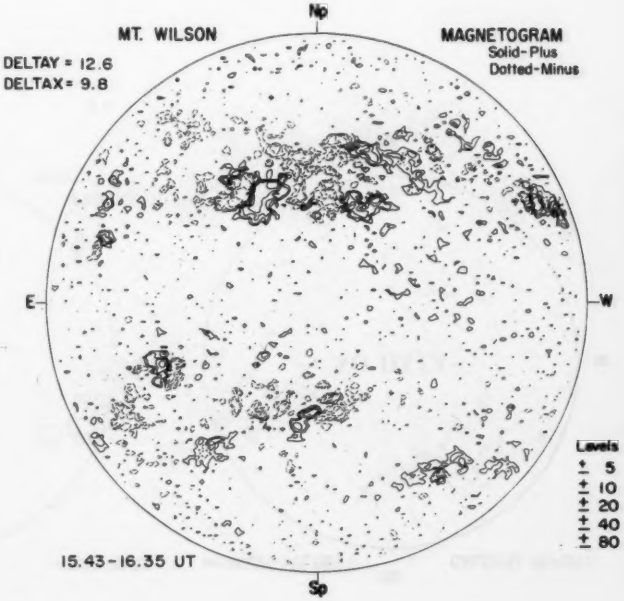
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1503 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

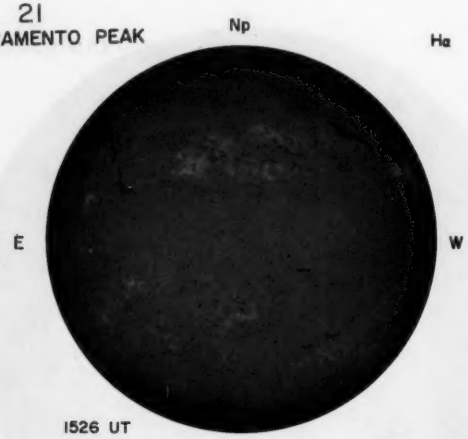
DELTAY = 12.6
DELTAX = 9.8



15.43 - 16.35 UT

21

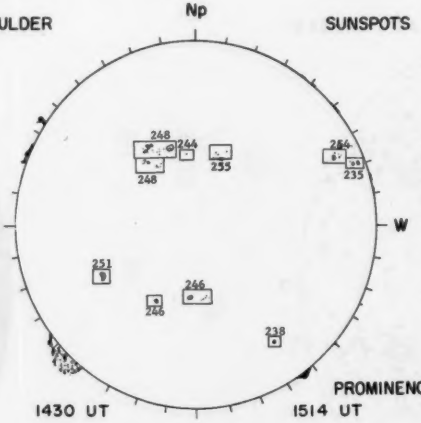
SACRAMENTO PEAK



1526 UT

Hα

BOULDER



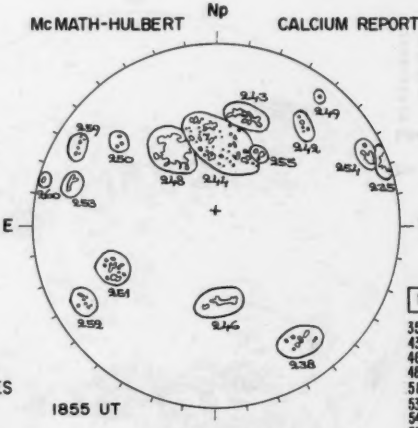
1430 UT

SUNSPOTS

PROMINENCES

1514 UT

McMATH-HULBERT



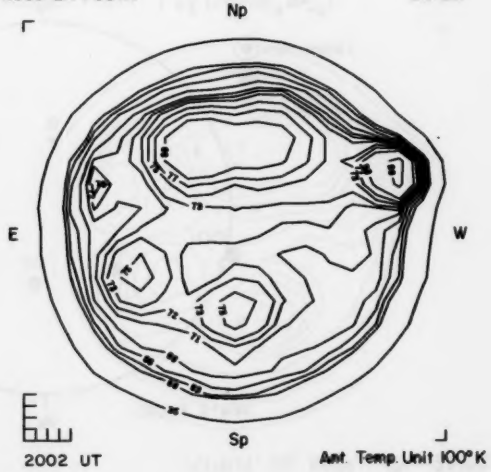
1855 UT

CALCIUM REPORT

FAIR	M
35 - 4000 - 3.0	
43 - 0900 - 2.5	
46 - 1000 - 2.5	
48 - 4000 - 3.0	
51 - 0800 - 3.0	
53 - 0500 - 2.5	
54 - 1000 - 3.5	
55 - 0400 - 2.5	

NOSC LA POSTA

2.0 CM

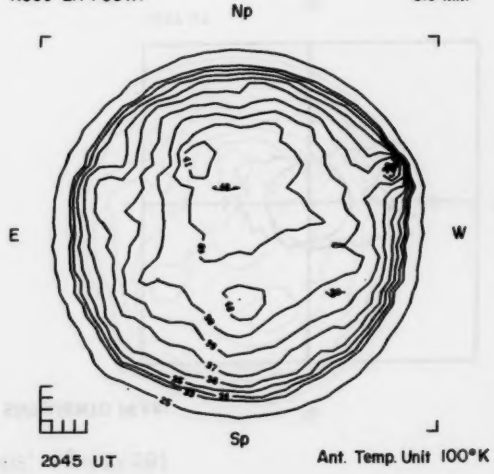


2002 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



2045 UT

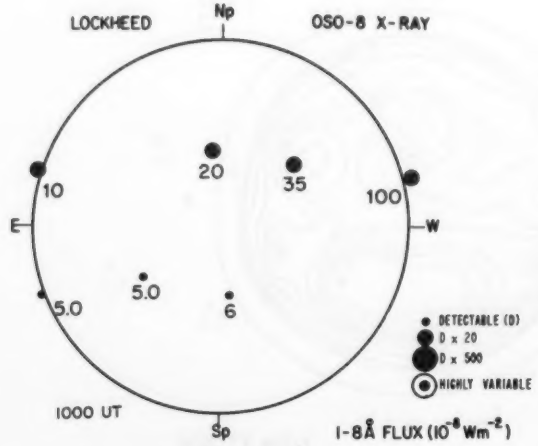
Ant. Temp. Unit 100°K

95

Apr 78

APRIL 22, 1978 (P=-25.52, B_o=-5.02, L_o=197.55)

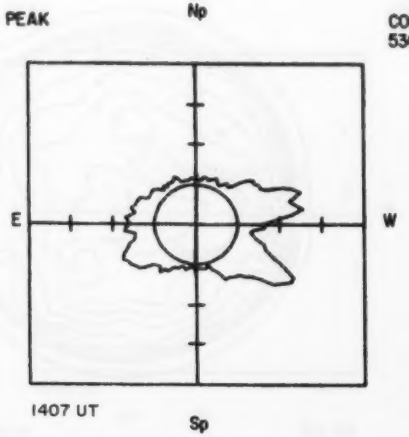
LOCKHEED OSO-8 X-RAY



1000 UT

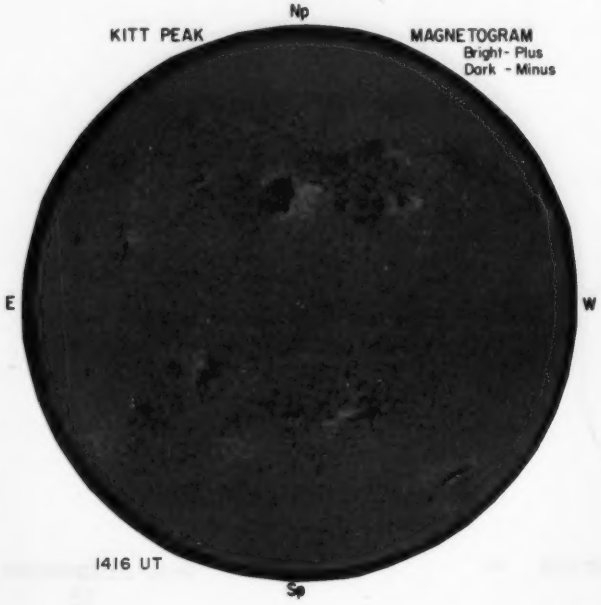
1-8Å FLUX (10^{-6} Wm^{-2})

SACRAMENTO PEAK



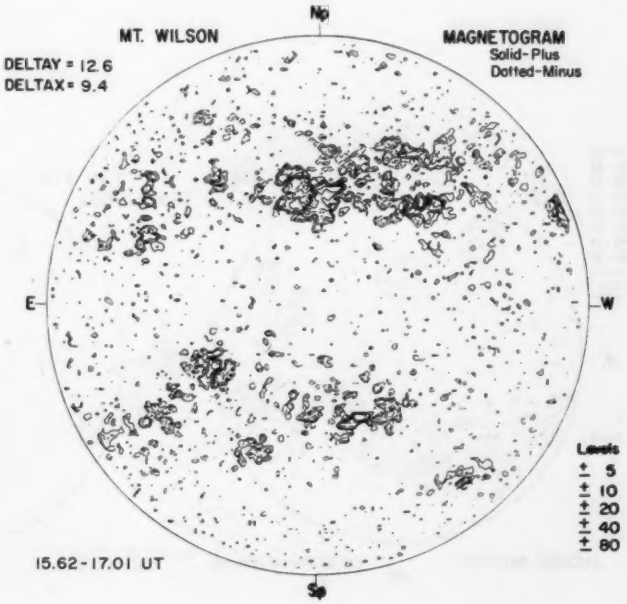
1407 UT

KITT PEAK



1416 UT

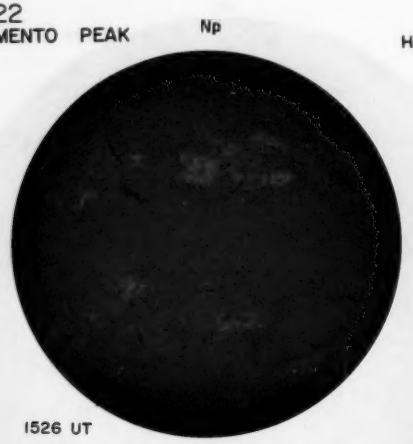
MT. WILSON



15.62-17.01 UT

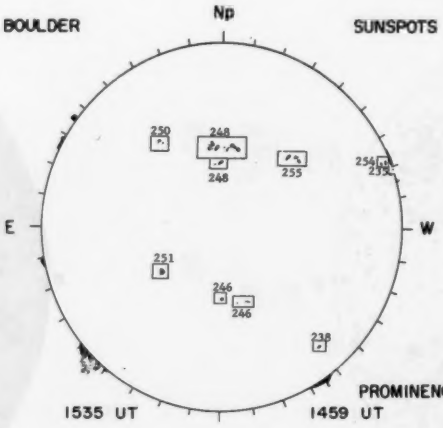
22

SACRAMENTO PEAK



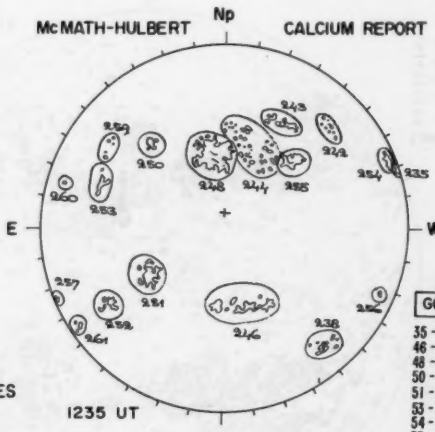
Hα

BOULDER



SUNSPOTS

McMATH-HULBERT

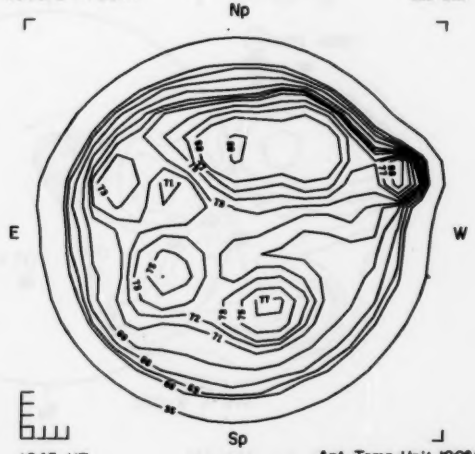


CALCIUM REPORT

GOOD	M
35 - 1500 - 3.0	
46 - 1400 - 2.5	
48 - 4000 - 3.0	
50 - 0500 - 2.5	
51 - 0800 - 2.5	
53 - 0600 - 2.5	
54 - 1400 - 3.5	
55 - 1300 - 3.0	

NOSC LA POSTA

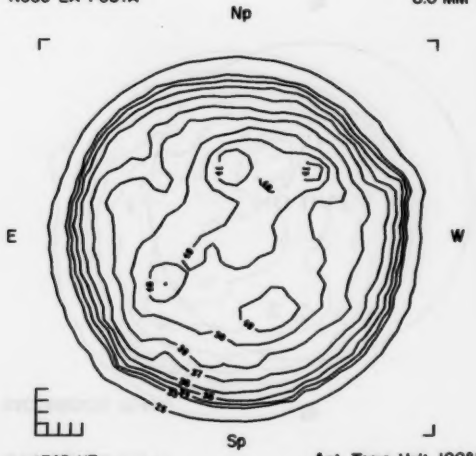
2.0 CM



Ant. Temp. Unit 100°K

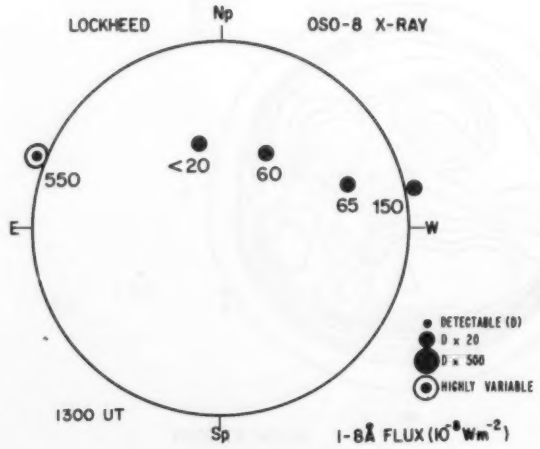
NOSC LA POSTA

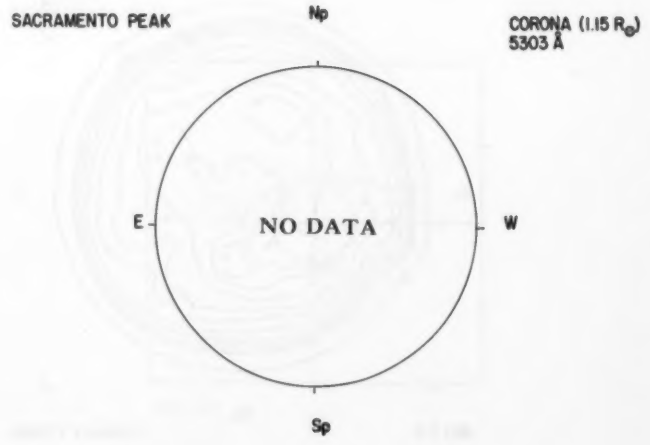
8.6 MM

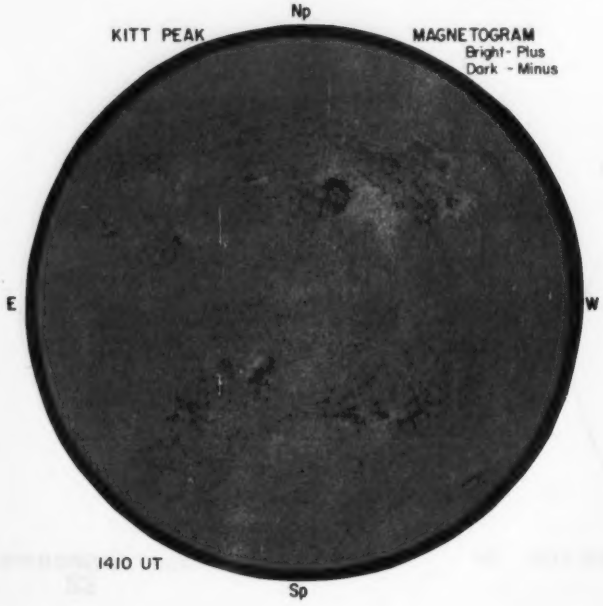


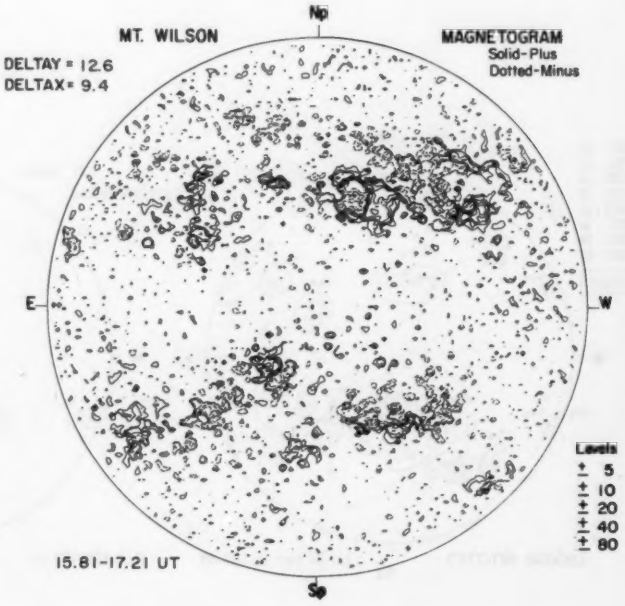
Ant. Temp. Unit 100°K

APRIL 23, 1978 (P =-25.41, B_0 =-4.93, L_0 =184.34)



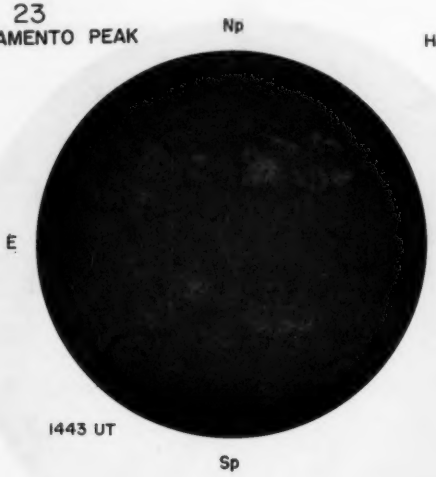




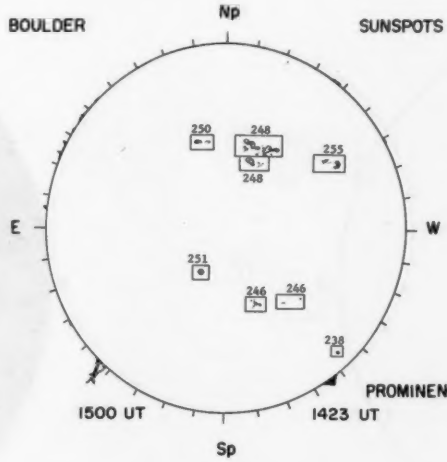


23

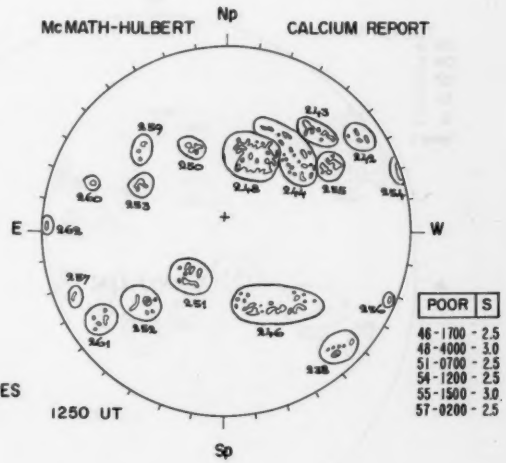
SACRAMENTO PEAK



BOULDER



SUNSPOTS



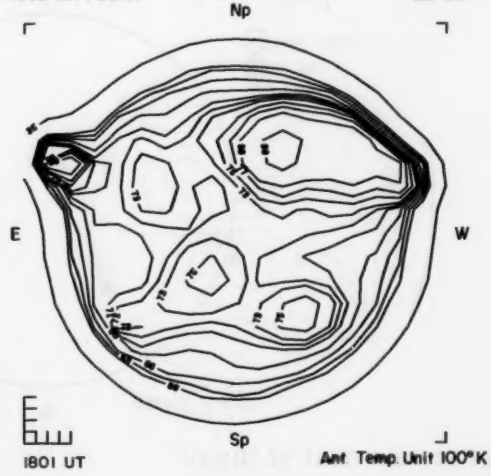
McMATH-HULBERT

CALCIUM REPORT

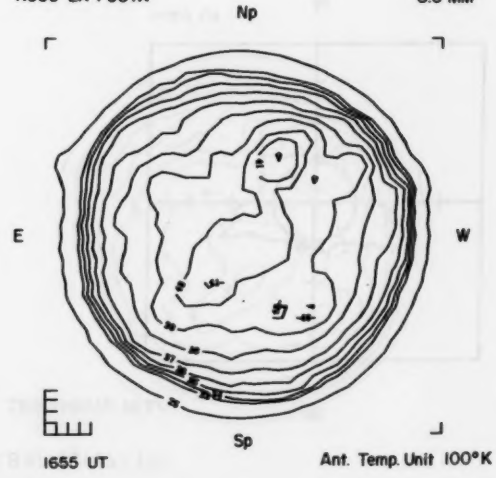
POOR	S

46-1700 - 2.5
48-4000 - 3.0
51-0700 - 2.5
54-1200 - 2.5
55-1500 - 3.0
57-0200 - 2.5

NOSC LA POSTA 2.0 CM

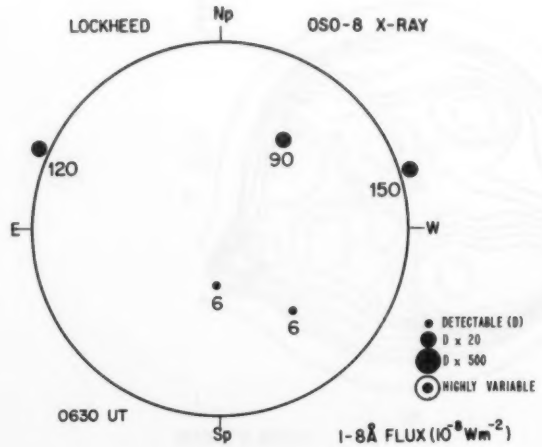


NOSC LA POSTA 8.6 MM



APRIL 24, 1978 (P=-25.29, B_o=-4.84, L_o=171.13)

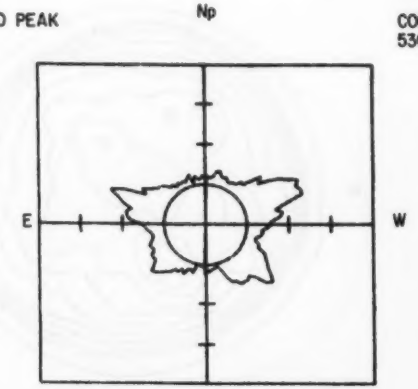
LOCKHEED OSO-8 X-RAY



0630 UT

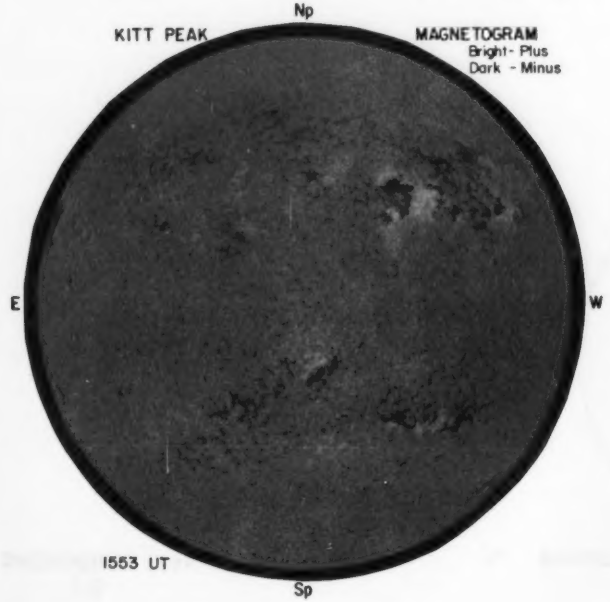
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



1440 UT

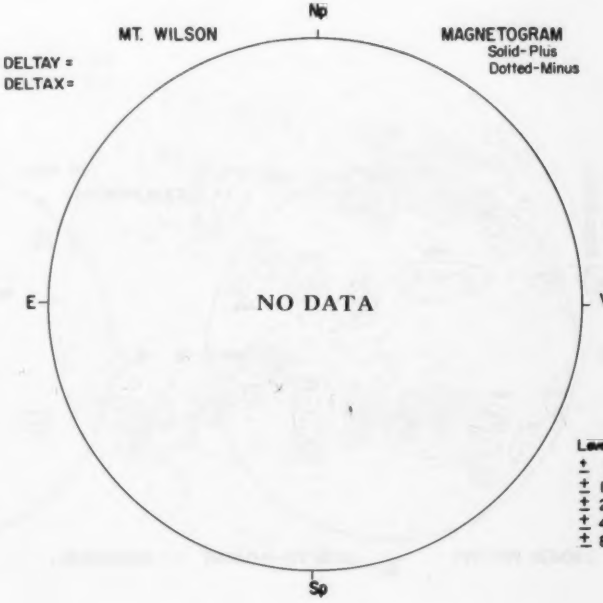
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1553 UT

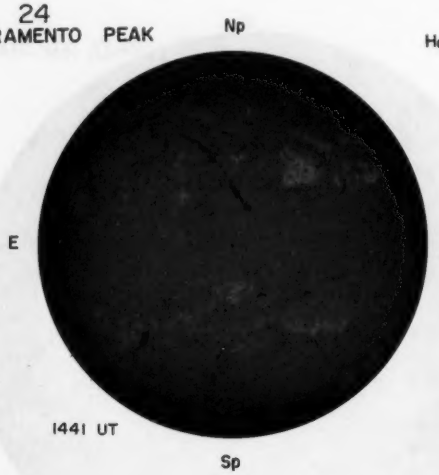
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

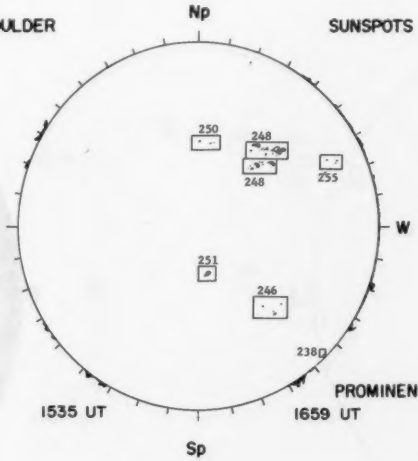


24

SACRAMENTO PEAK

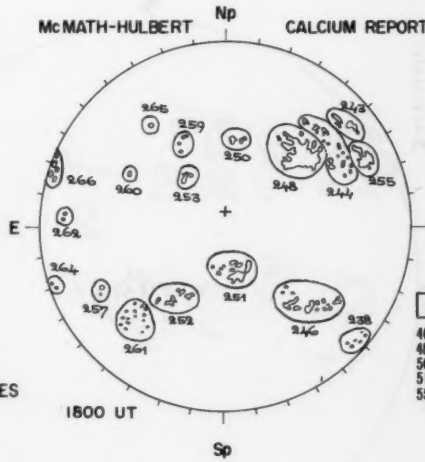


Hα BOULDER



SUNSPOTS

McMATH-HULBERT

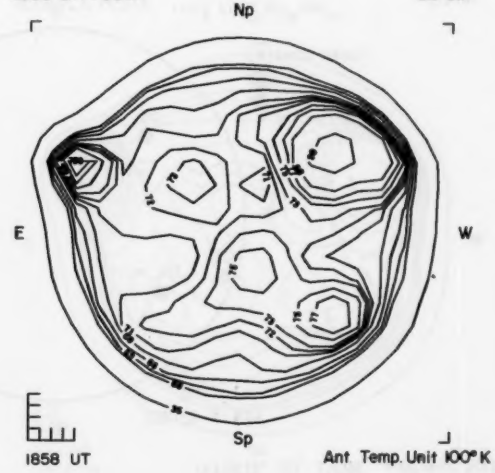


CALCIUM REPORT

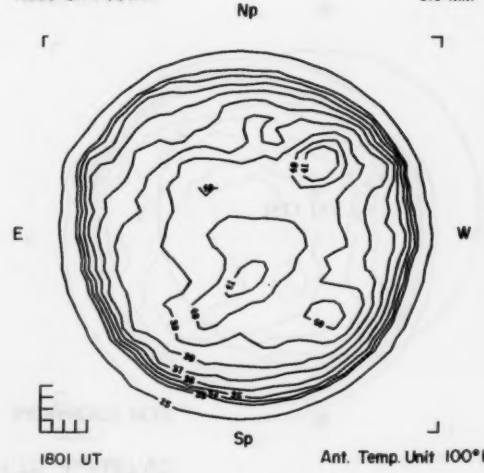
PROMINENCES

FAIR	D
46 - 1700 - 3.0	
48 - 4500 - 3.0	
50 - 0400 - 2.5	
51 - 1000 - 2.5	
55 - 2000 - 3.0	

NOSC LA POSTA 2.0 CM

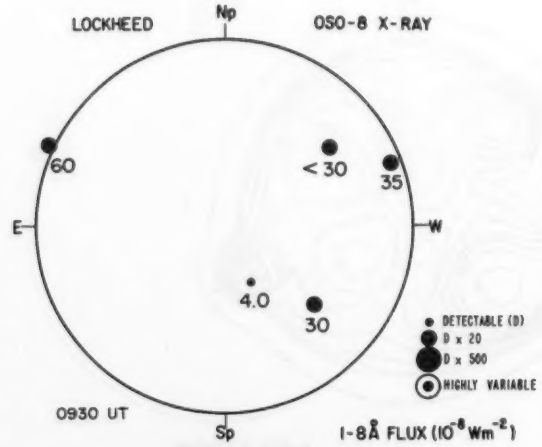


NOSC LA POSTA 8.6 MM



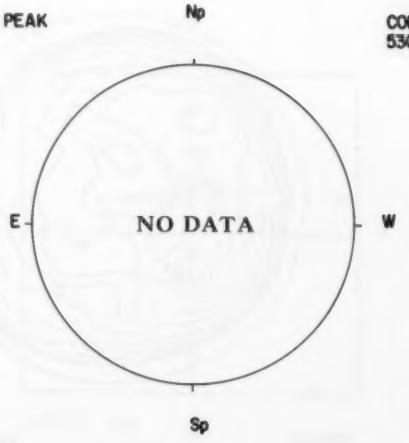
APRIL 25, 1978 (P=-25.16, B_o=-4.75, L_o=157.92)

LOCKHEED OSO-8 X-RAY

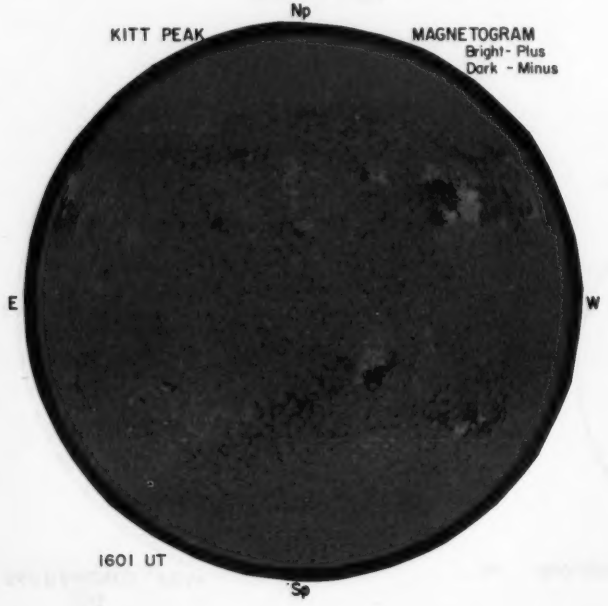


1-8Å FLUX (10^{-8} Wm^{-2})

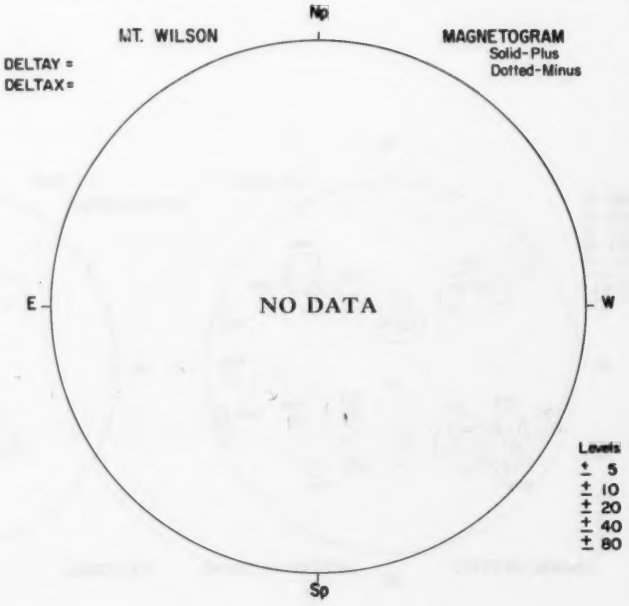
SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

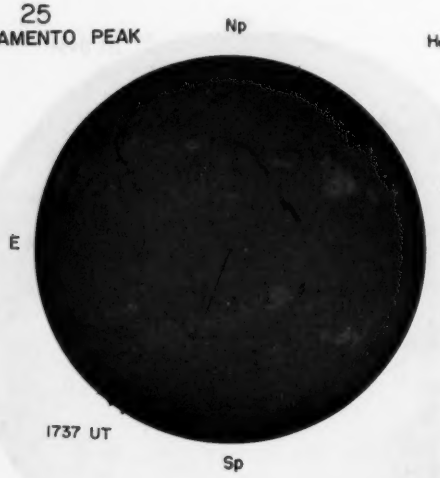


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =

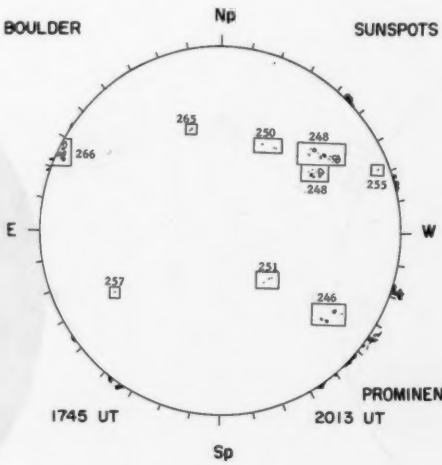


25

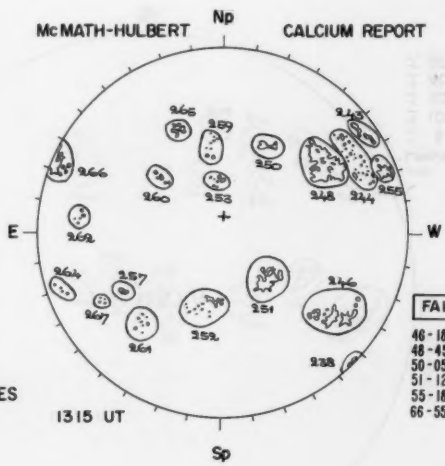
SACRAMENTO PEAK



BOULDER SUNSPOTS

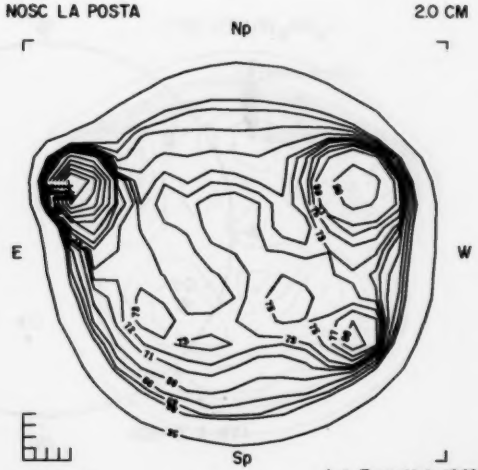


McMATH-HULBERT CALCIUM REPORT

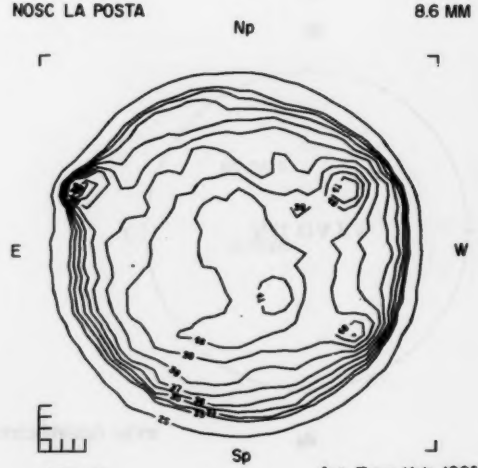


PROMINENCES

NOSC LA POSTA 2.0 CM

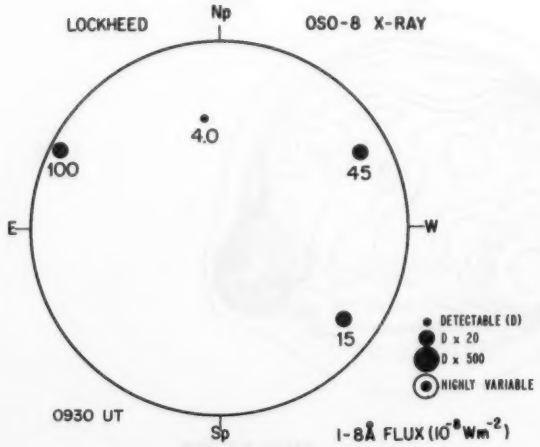


NOSC LA POSTA 8.6 MM



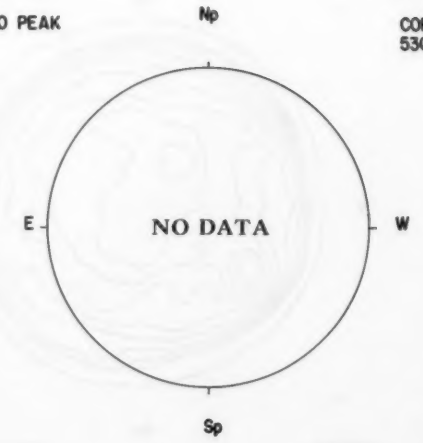
APRIL 26, 1978 (P =-25.02, B_o =-4.66, L_o =144.71)

LOCKHEED OSO-8 X-RAY

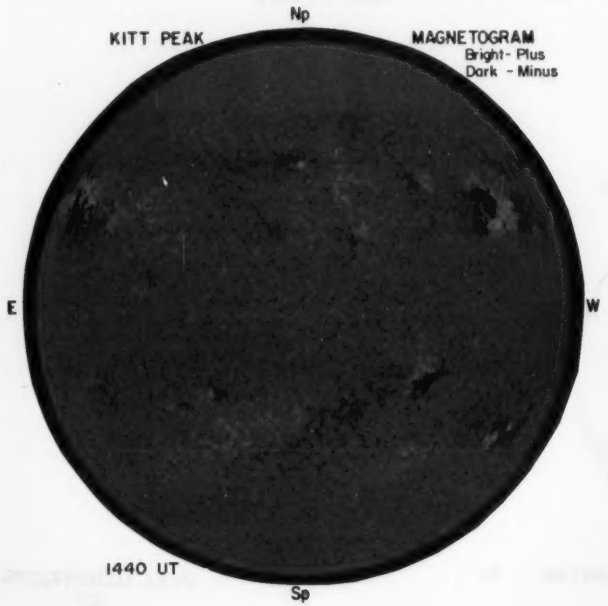


1-8Å FLUX (10^{-8} Wm^{-2})

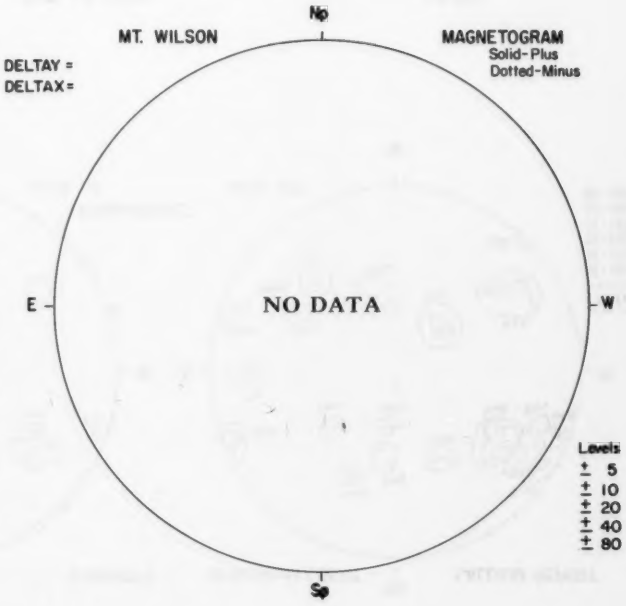
SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

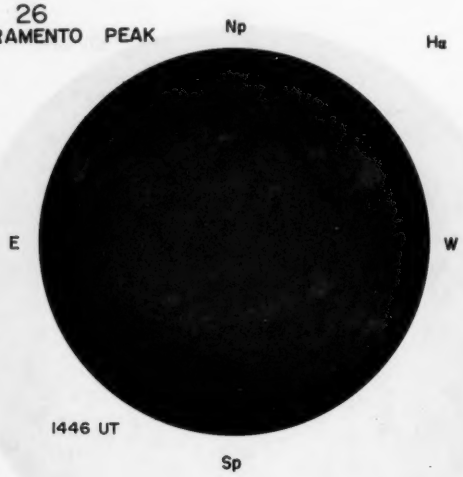


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX=



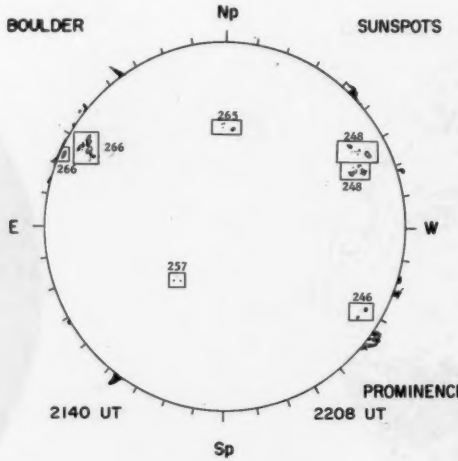
26

SACRAMENTO PEAK



1446 UT

BOULDER



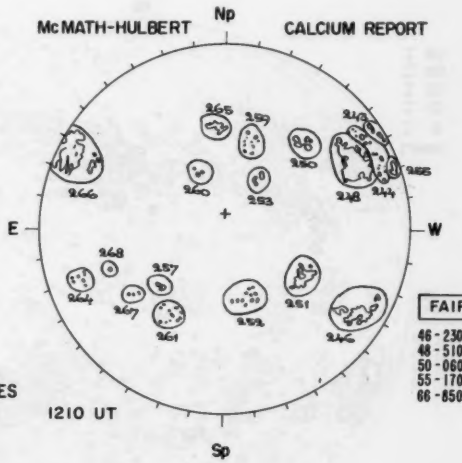
2140 UT

PROMINENCES

2208 UT

McMATH-HULBERT

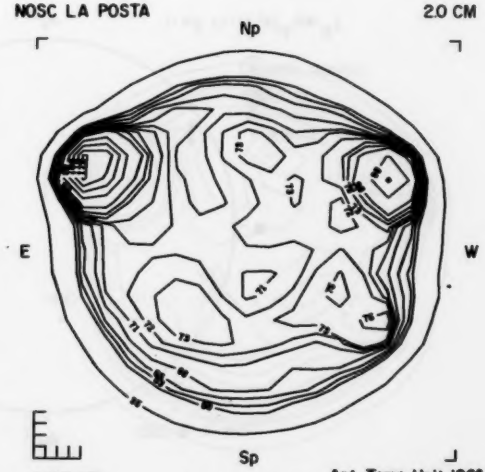
CALCIUM REPORT



1210 UT

NOSC LA POSTA

2.0 CM



2105 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

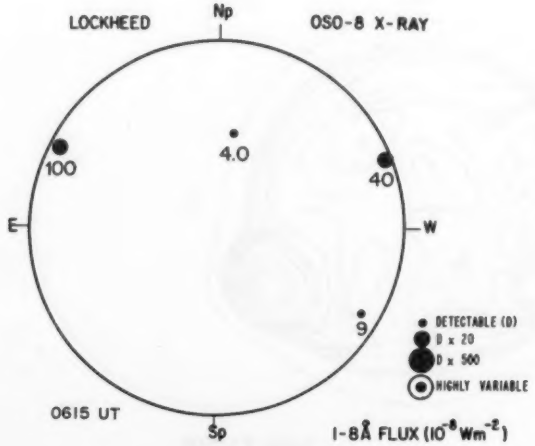
---- UT

Ant. Temp. Unit 100°K

105
Apr 78

APRIL 27, 1978 (P=-24.88, B_o=-4.56, L_o=131.49)

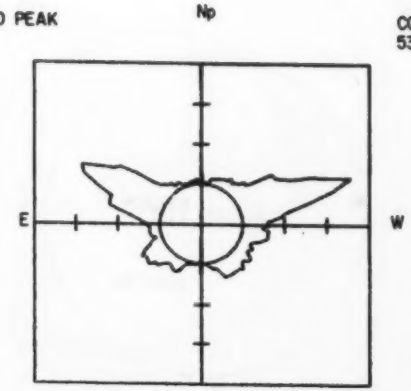
LOCKHEED OSO-8 X-RAY



0615 UT

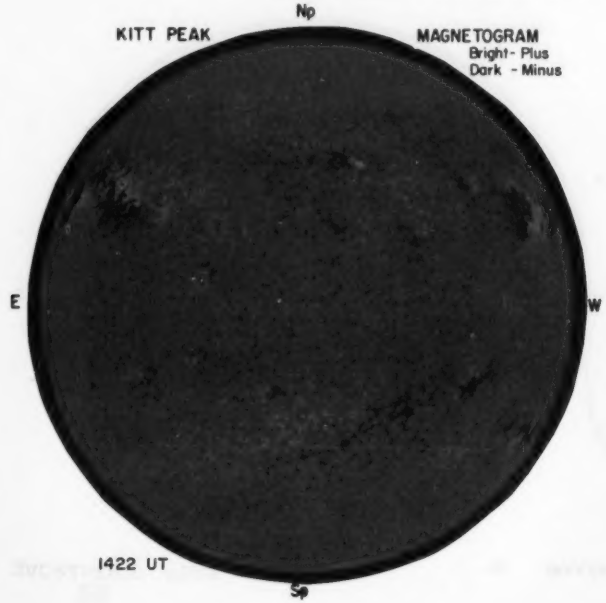
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK



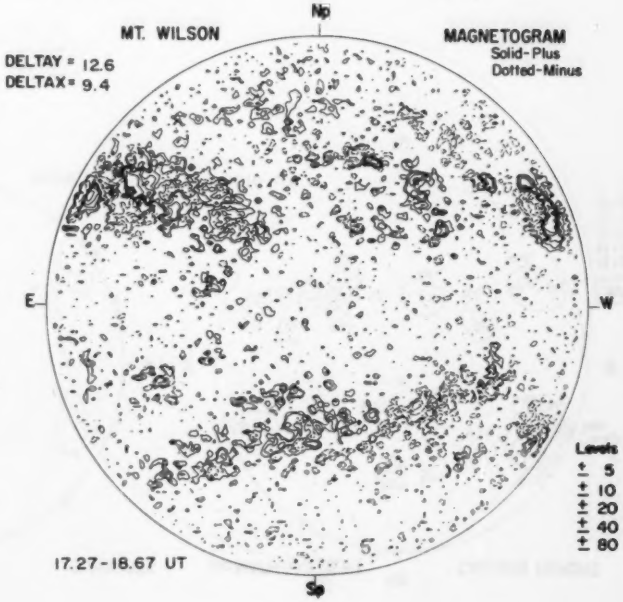
1425 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1422 UT

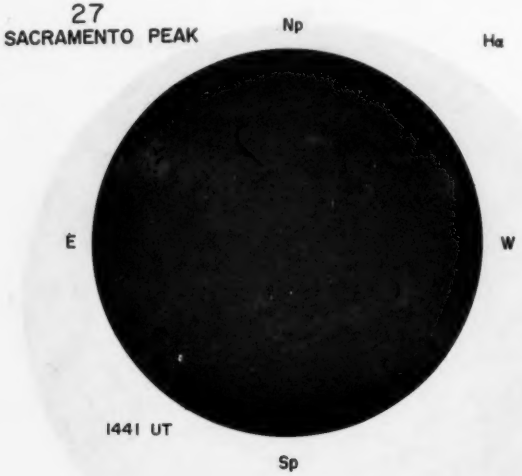
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.4



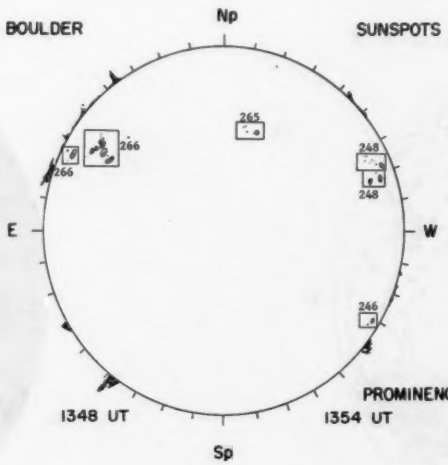
17.27-18.67 UT

27

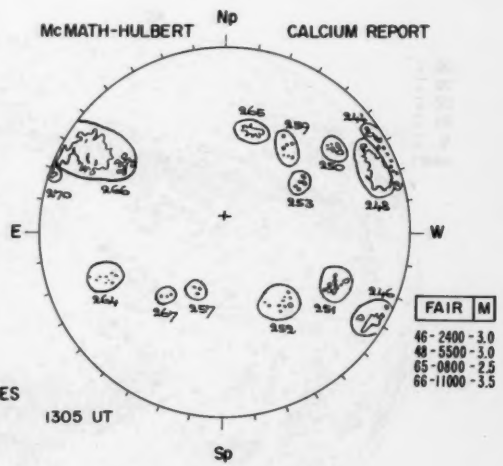
SACRAMENTO PEAK



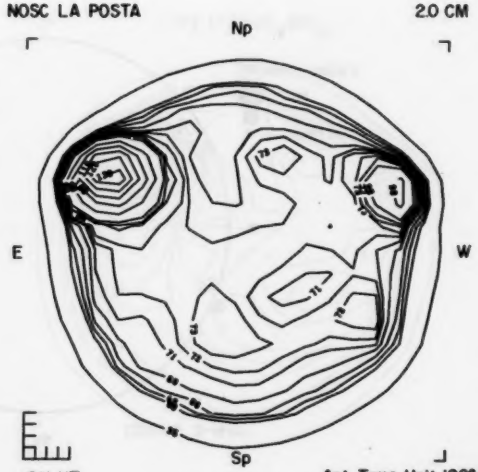
BOULDER SUNSPOTS



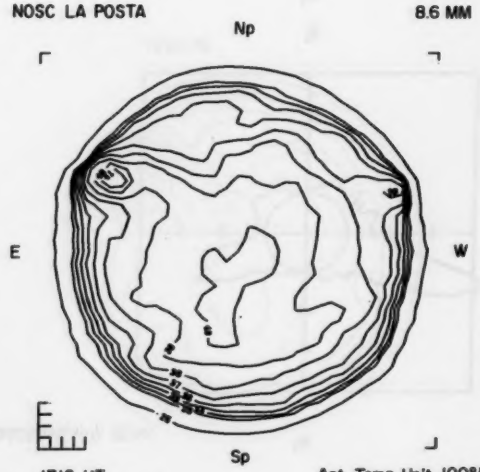
McMATH-HULBERT CALCIUM REPORT



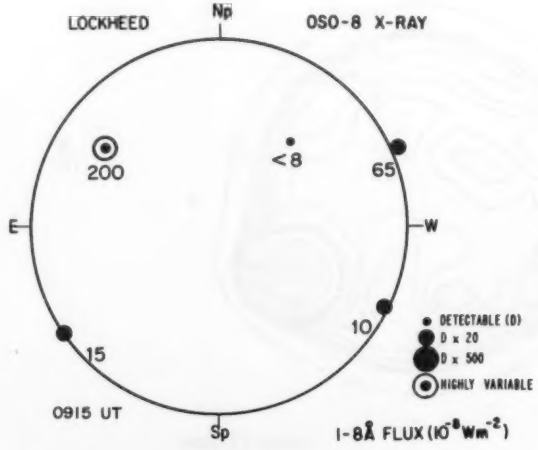
NOSC LA POSTA 2.0 CM

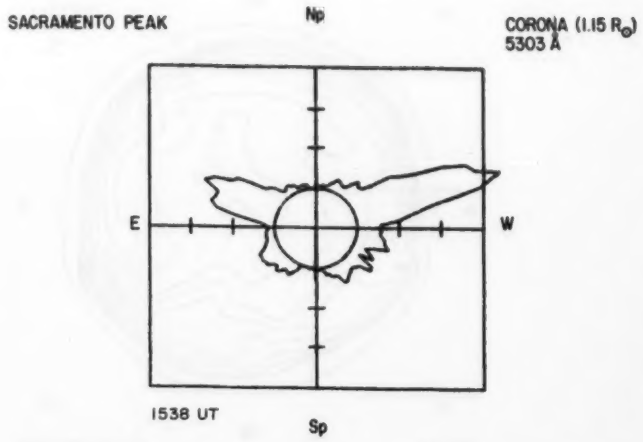


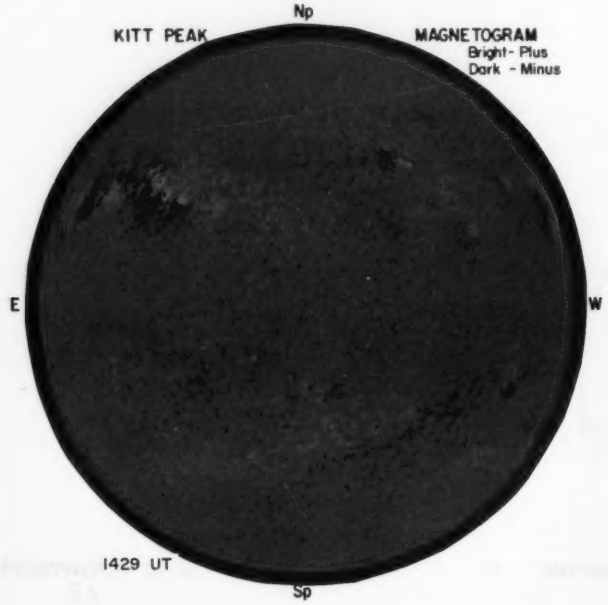
NOSC LA POSTA 8.6 MM

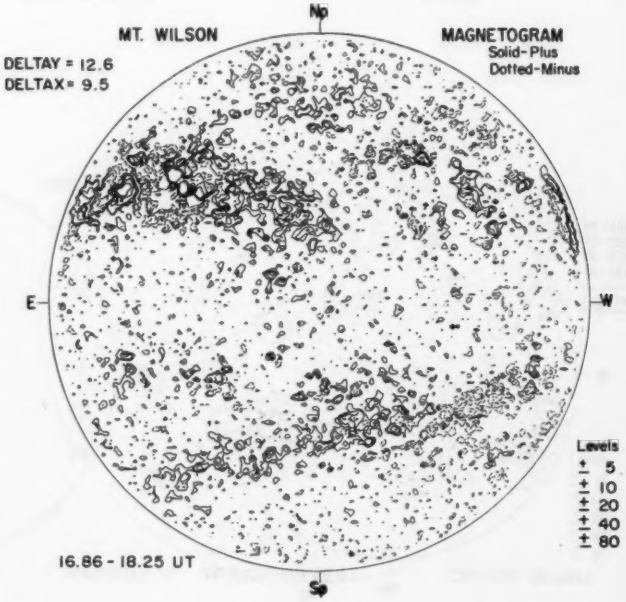


APRIL 28, 1978 (P=-24.73, B_o=-4.47, L_o=118.28)



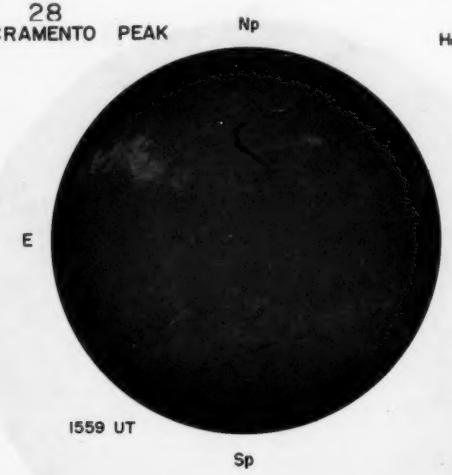






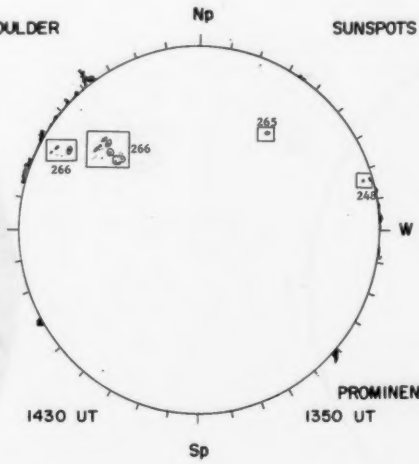
28

SACRAMENTO PEAK



1559 UT

Hα BOULDER



1430 UT

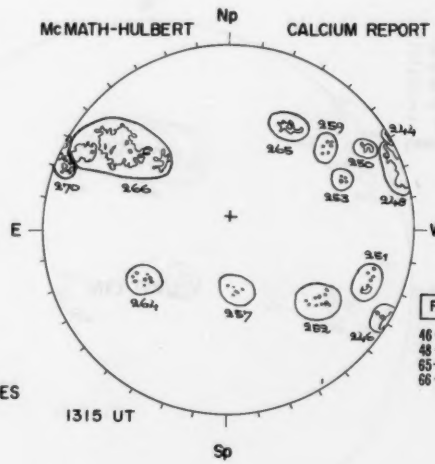
SUNSPOTS

PROMINENCES

1350 UT

McMATH-HULBERT

CALCIUM REPORT

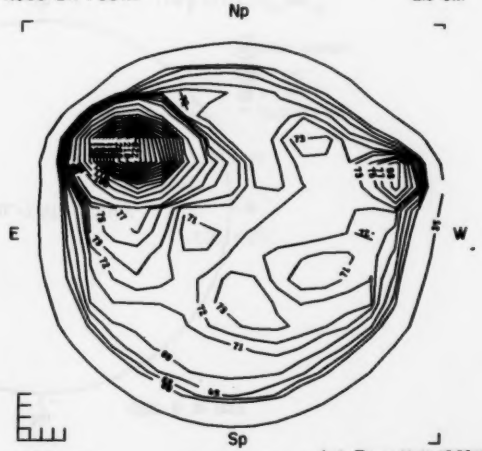


1315 UT

FAIR | D

46 - 1500 - 2.5
48 - 4600 - 3.0
65 - 0800 - 2.5
66 - 11500 - 3.5

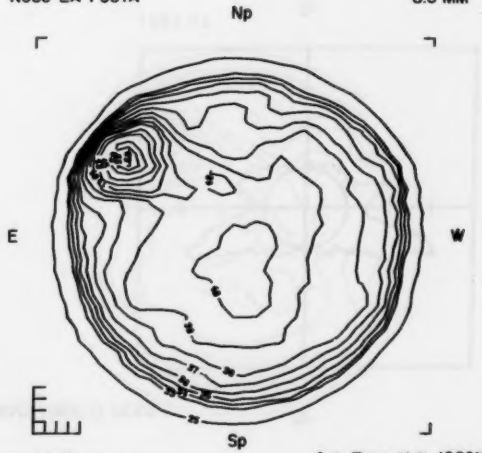
NOSC LA POSTA 2.0 CM



1936 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

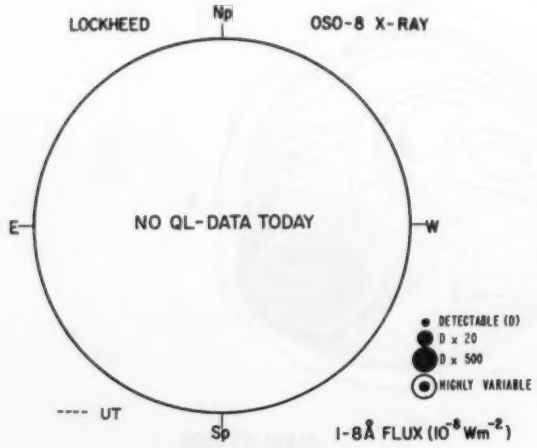


1824 UT

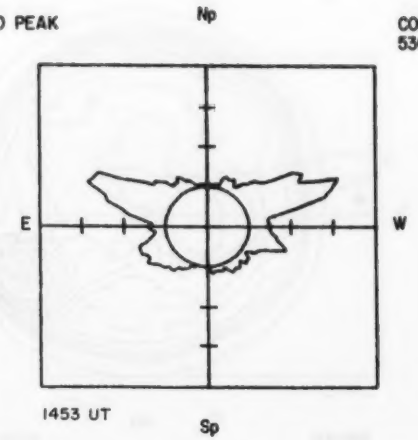
Ant. Temp. Unit 100°K

APRIL 29, 1978 (P=-24.58, B_o=-4.37, L_o=105.06)

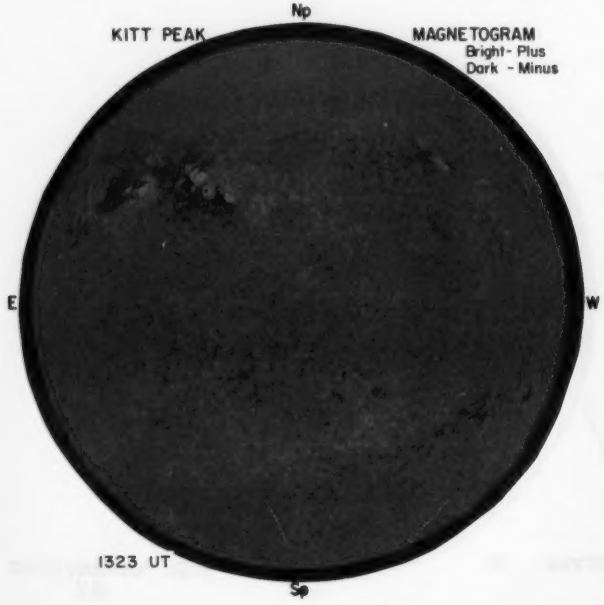
LOCKHEED OSO-8 X-RAY



SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

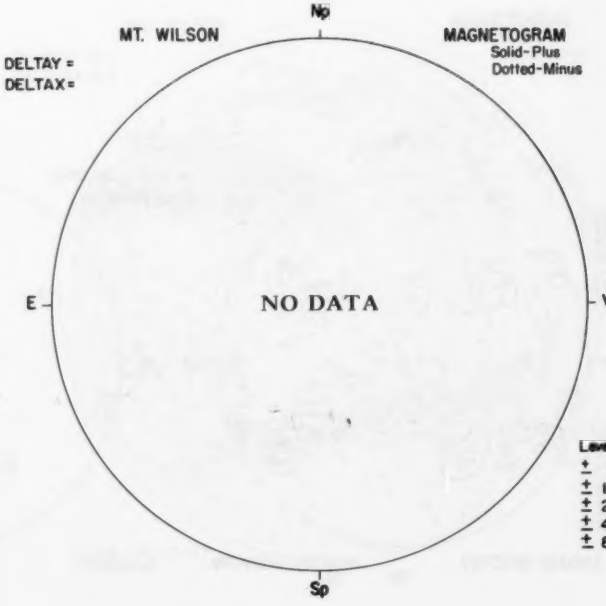


KITT PEAK MAGNETOGRAM Bright- Plus Dark - Minus



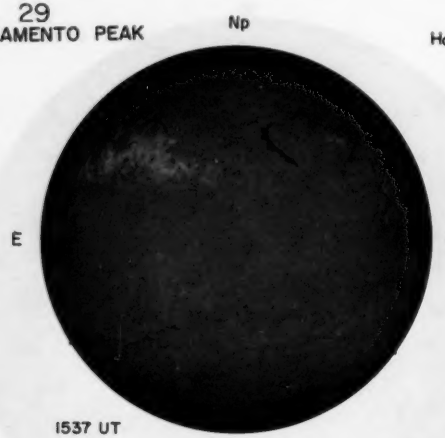
MT. WILSON MAGNETOGRAM Solid- Plus Dotted- Minus

DELTAY =
DELTAX =



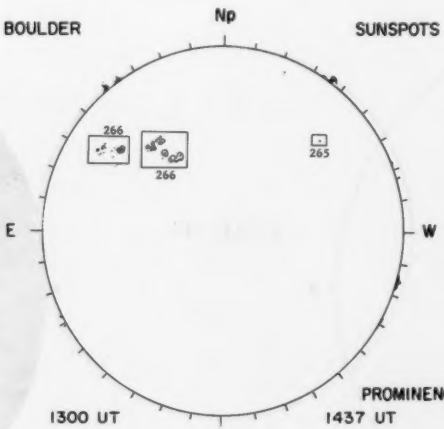
29

SACRAMENTO PEAK



Hα

BOULDER

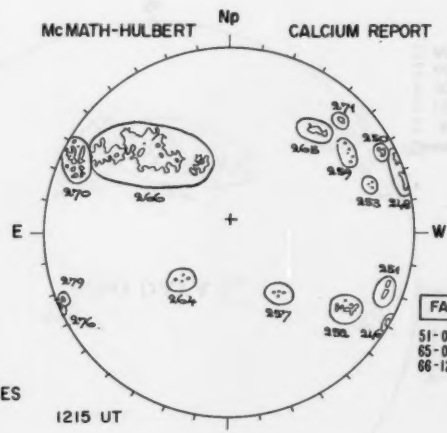


SUNSPOTS

PROMINENCES

McMATH-HULBERT

CALCIUM REPORT



FAIR | M

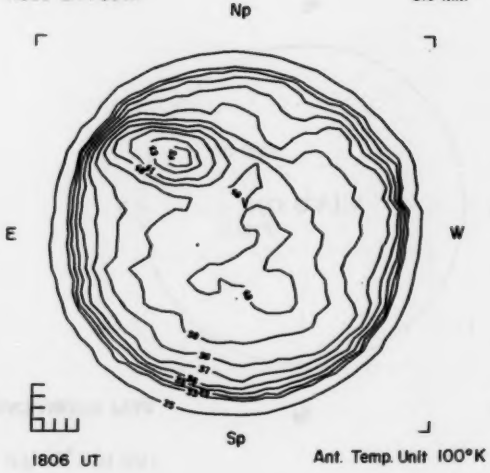
51 - 0600 - 2.5
65 - 0800 - 2.5
66 - 12000 - 3.5

NOSC LA POSTA

2.0 CM

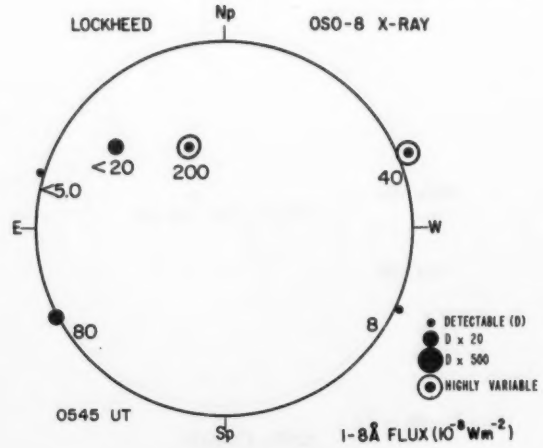
NOSC LA POSTA

8.6 MM



APRIL 30, 1978 (P =-24.41, B_o =-4.27, L_o =91.85)

LOCKHEED OSO-8 X-RAY

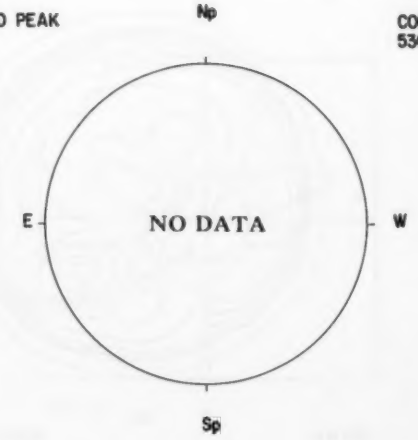


0545 UT

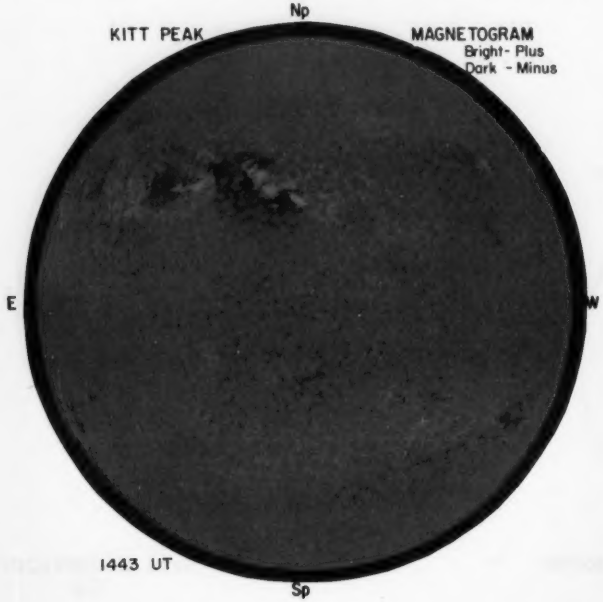
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



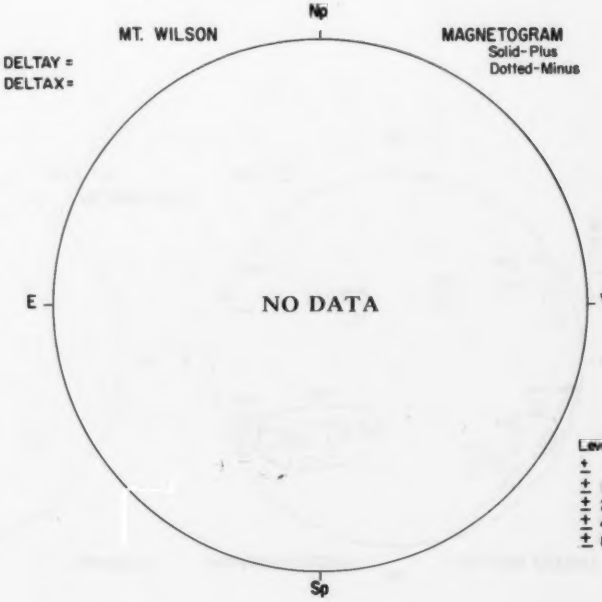
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1443 UT

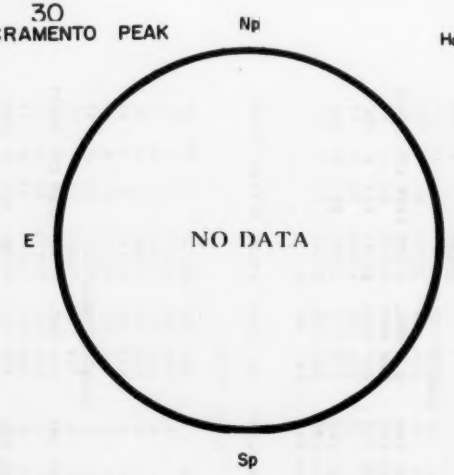
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



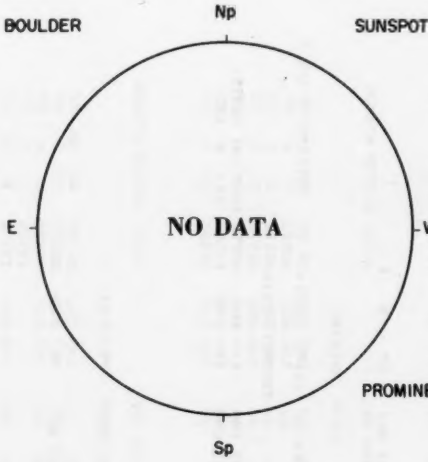
30

SACRAMENTO PEAK



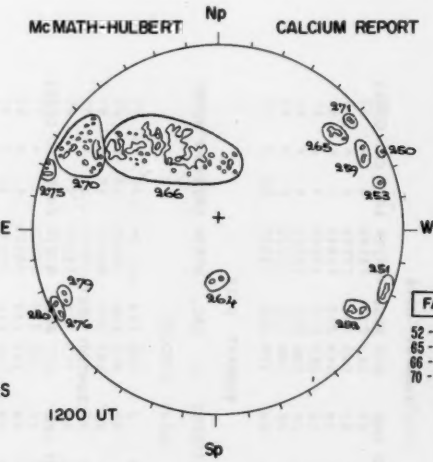
Hα

BOULDER



SUNSPOTS

McMATH-HULBERT



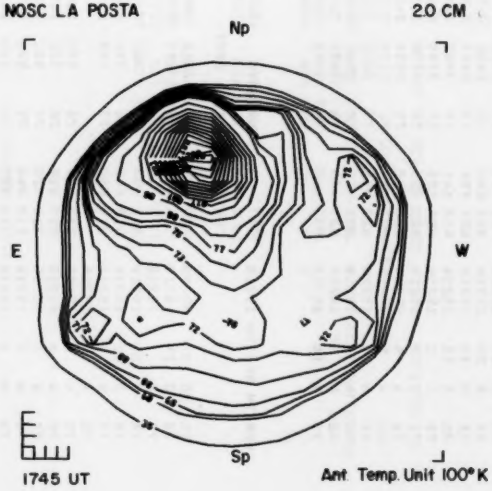
CALCIUM REPORT

PROMINENCES

1200 UT

NOSC LA POSTA

2.0 CM



1745 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

---- UT

Ant. Temp. Unit 100°K

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15219 CMP DATE 2.0

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	29	15219	S29 E43	104	200	1.0									
78	3	30	15219	S29 E31	101	200	1.5									
78	3	31	15219	S29 E18	101	100	1.5									

MCMATH REGION 15215 CMP DATE 2.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	29	15215	S14 E52	95	100	2.0									

MCMATH REGION 15213 CMP DATE 2.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	28	15213	N14 E67	89	800	3.0									
78	3	29	15213	N14 E56	91	700	3.0									
78	3	30	15213	N13 E41	91	700	2.0									
78	3	31	15213	N13 E26	93	700	2.0									
78	4	1	15213	N12 E14	94	700	2.0									
78	4	2	15213	N12 W01	94	400	2.0									
78	4	4	15213	N12 W28	94	400	2.0									
78	4	5	15213	N12 W41	96	500	2.0	19993	N10 W47	97	X	1				
78	4	7	15213	N13 W68	95	400	1.5									

MCMATH REGION 15214 CMP DATE 3.6 RETURN OF REGION 15172 ROTATION 3 AND 4

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	28	15214	N24 E78	78	1000	2.5	19985	N21 E58	87	(B)	3	B	10	2	BXO
78	3	29	15214	N23 E68	79	2400	2.5									
78	3	30	15214	N23 E54	78	3400	2.5									
78	3	31	15214	N23 E41	78	3500	2.5									
78	4	1	15214	N23 E28	80	3200	2.5									
78	4	2	15214	N23 E15	78	3000	2.5									
78	4	4	15214	N23 W13	79	2800	2.5									
78	4	5	15214	N23 W25	80	3000	2.5	19994	N21 W25	75	(B)	1				
78	4	7	15214	N23 W51	78	2800	2.5									
78	4	8	15214	N23 W64	78	2500	3.0									
78	4	9	15214	N23 W75	76	1800	3.0	19994	N22 W77	75	(B)	3				
78	4	10	15214	N23 W87	76	1300	1.5									

MCMATH REGION 15216 CMP DATE 3.9

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	29	15216	S16 E71	76	100	2.5	19986	S17 E67	78	(AP)	3				
78	3		15216					19987	S16 E78	67	(AP)	3	B	60	1	HSX
78	3	30	15216	S18 E57	75	300	3.5									
78	3	31	15216	S18 E43	76	300	3.0		S17 E42				B	30	6	CSO
78	4	1	15216	S18 E31	77	400	2.0	19986	S18 E28	77	B	2				
78	4		15216					19987	S15 E37	68	AP	2				
78	4	2	15216	S18 E17	76	500	2.5									
78	4	4	15216	S18 W10	76	700	2.5									
78	4	5	15216	S18 W22	77	500	2.0	19987	S15 W18	68	(AP)	2				
78	4	7	15216	S18 W48	75	600	2.0									
78	4	8	15216	S18 W60	74	600	2.0									
78	4	9	15216	S17 W73	74	600	2.5									
78	4	10	15216	S17 W85	74	600	1.5									

MCMATH REGION 15217 CMP DATE 5.2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	29	15217	S14 E88	59	400	1.5									
78	3	30	15217	S14 E74	58	1100	2.0									
78	3	31	15217	S15 E59	60	1100	3.0		S15 E51				B	30	1	HSX
78	4	1	15217	S15 E48	60	1100	2.5									

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REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15217 (CONT) CMP DATE 5.2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	2	15217	S15 E34	59	900	2.5									
78	4	4	15217	S15 E07	59	800	2.0									
78	4	5	15217	S15 W06	61	900	2.0									
78	4	7	15217	S15 W35	62	1000	2.0									
78	4	8	15217	S15 W47	61	1200	2.0									
78	4	9	15217	S16 W58	59	900	1.5									
78	4	10	15217	S15 W71	60	500	1.5									

MCMATH REGION 15220 CMP DATE 5.2 RETURN OF PART OF 15172 ROTATION 3 AND 4

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	30	15220	N33 E76	56	700	2.5									
78	3	31	15220	N32 E61	58	800	3.0		N31 E60				B	30	3	BXO
78	4	1	15220	N30 E49	59	1400	2.5	19990	N30 E44	61	X	1				
78	4	2	15220	N30 E35	58	1600	2.5									
78	4	4	15220	N30 E07	59	1500	2.5									
78	4	5	15220	N30 W06	61	1500	2.5									
78	4	7	15220	N31 W33	60	1600	2.0									
78	4	8	15220	N30 W45	59	1400	1.5									
78	4	9	15220	N30 W60	61	1100	1.0									
78	4	10	15220	N30 W72	61	1000	1.0									

MCMATH REGION 15234 CMP DATE 6.3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	7	15234	N34 W17	44	300	2.0									
78	4	8	15234	N35 W32	46	400	2.0									
78	4	9	15234	N34 W45	46	400	2.0									
78	4	10	15234	N34 W57	46	500	2.0									
78	4	11	15234	N34 W72	46	400	1.5									
78	4	12	15234	N34 W85	48	300	1.0									

MCMATH REGION 15221 CMP DATE 7.3 RETURN OF REGION 15175 ROTATION 3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	3	31	15221	N20 E87	32	600	3.5		N21 E78				B	30	1	HSX
78	4	1	15221	N20 E75	33	3300	3.5	19991	N15 E69	36	AP	1				
78	4		15221					19992	N20 E70	35	B	3				
78	4	2	15221	N20 E61	32	3700	3.0									
78	4	4	15221	N21 E35	31	4500	3.5									
78	4	5	15221	N21 E24	31	5000	3.5	19991	N15 E14	36	(AP)	3				
78	4		15221					19992	N20 E19	31	(B)	4				
78	4	7	15221	N21 W03	30	5000	3.5									
78	4	8	15221	N21 W16	30	5000	3.0									
78	4	9	15221	N21 W29	30	4800	3.0	19992	N20 W33	31	(B)	4				
78	4	10	15221	N21 W42	31	4500	3.0	19992	N20 W45	31	(B)	4				
78	4	11	15221	N22 W55	29	4500	3.5	19992	N20 W58	33	(D)	4				
78	4	12	15221	N22 W66	29	4200	3.5	19992	N20 W70	31	(D)	4				
78	4	13	15221	N22 W80	27	1800	2.5									
78	4	14	15221	N23 W88	25	800	1.0									

MCMATH REGION 15227 CMP DATE 9.3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	4	15227	S26 E65	1	700	3.5									
78	4	5	15227	S26 E53	2	600	3.5	19995	S28 E46	4	(BP)	3				
78	4	7	15227	S26 E23	4	800	3.0									
78	4	8	15227	S26 E10	4	900	2.5									
78	4	9	15227	S26 W03	4	900	2.0	19995	S26 W12	10	(AP)	3				
78	4	10	15227	S27 W17	6	1000	2.5	19995	S26 W23	9	(BP)	3				
78	4	11	15227	S27 W32	6	1400	3.0	19995	S26 W34	9	(BP)	4				
78	4	12	15227	S27 W44	7	1800	3.0	19995	S26 W46	7	(BP)	3				
78	4	13	15227	S27 W59	6	1600	3.0		S27 W58				B	150	7	DAI
78	4	14	15227	S27 W68	5	1600	3.5		S26 W70				B	20	4	CSO
78	4	15	15227	S27 W78	2	1400	3.0									

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15228 CMP DATE 9.3 RETURN OF REGION 15177 (REMNANTS) ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	4	4	15228	N03 E66	0	500	1.0								
78	4	5	15228	N02 E53	2	500	1.0								
78	4	7	15228	N02 E23	4	600	1.5								
78	4	8	15228	N02 E10	4	500	1.0								

MCMATH REGION 15230 CMP DATE 9.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	4	4	15230	N33 E64	2	600	2.5								
78	4	5	15230	N33 E51	4	500	2.5								
78	4	7	15230	N33 E24	3	500	2.0								
78	4	8	15230	N33 E12	2	400	2.0								
78	4	9	15230	N33 E00	1	400	1.5								
78	4	10	15230	N33 W14	3	400	1.5								
78	4	11	15230	N34 W26	0	400	1.5								
78	4	12	15230	N34 W36	359	300	1.5								

MCMATH REGION 15229 CMP DATE 9.9 RETURN OF REGION 15176 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	4	4	15229	N17 E72	355	3600	3.0								
78	4	5	15229	N17 E60	356	3600	3.0	19996	N15 E55	356	(AP)	3			
78	4	7	15229	N17 E31	357	3800	3.0								
78	4	8	15229	N17 E18	357	4000	3.0								
78	4	9	15229	N17 E04	358	3800	2.5	19999	N15 W06	4	(B)	2			
78	4	10	15229	N17 W09	358	3800	3.0	19999	N15 W18	4	(AP)	1			
78	4	11	15229	N18 W24	358	3800	3.0	19999	N15 W29	4	AP	1			
78	4		15229					20004	N17 W15	350	(B)	2			
78	4	12	15229	N18 W35	358	3500	2.5								
78	4	13	15229	N18 W51	358	3100	2.5								
78	4	14	15229	N18 W68	357	2800	2.5								
78	4	15	15229	N18 W70	354	1400	2.0								
78	4	16	15229	N18 W84	355	600	1.0								

MCMATH REGION 15236 CMP DATE 10.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	4	8	15236	S25 E24	351	200	1.0								
78	4	9	15236	S26 E12	350	300	1.5	20000	S26 E10	349	(AF)	1			
78	4	10	15236	S27 W01	350	300	1.5								
78	4	11	15236	S27 W16	350	400	1.5								
78	4	12	15236	S26 W25	348	300	1.0								
78	4	13	15236	S26 W42	349	200	1.0								
78	4	14	15236	S26 W55	352	100	1.5								
78	4	15	15236	S27 W68	352	100	1.5								

MCMATH REGION 15231 CMP DATE 11.4

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	4	5	15231	N19 E82	334	700	3.0	19997	N17 E70	341	X	1			
78	4	7	15231	N18 E52	336	1200	2.5								
78	4	8	15231	N18 E38	337	1100	3.0								
78	4	9	15231	N17 E24	338	800	2.0	19997	N16 E19	340	(AP)	3			
78	4	10	15231	N17 E11	338	400	2.5	19997	N17 E08	338	(B)	2			
78	4	11	15231	N17 W04	338	500	2.5	19997	N16 W04	339	B	1			
78	4	12	15231	N17 W15	338	500	1.5								
78	4	13	15231	N17 W30	337	300	1.0								
78	4	14	15231	N17 W39	336	400	1.5								
78	4	15	15231	N18 W53	337	300	1.0								
78	4	16	15231	N18 W67	338	300	3.0								
78	4	17	15231	N18 W79	336	300	2.0								

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15232 CMP DATE 12.1

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	5	15232	S29 E83	333	1100	2.5	19998	S29 E75	336	(AP)	3				
78	4	7	15232	S29 E57	331	1200	2.5									
78	4	8	15232	S29 E45	330	1300	3.0									
78	4	9	15232	S30 E33	329	1200	2.5	19998	S30 E29	330	(B)	3				
78	4	10	15232	S30 E20	329	1800	3.0	19998	S29 E15	331	(B)	3				
78	4	11	15232	S30 E05	329	2000	2.5	19998	S29 E03	332	(BP)	3				
78	4	12	15232	S30 W05	328	2000	2.5	19998	S30 W10	331	(BP)	3				
78	4	13	15232	S31 W20	327	2000	3.0		S27 W23				B	10	3	BXO
78	4	14	15232	S31 W30	327	1800	3.0		S28 W38				B	10	1	AXX
78	4	15	15232	S30 W42	326	1800	3.0		S29 W43				R	10	3	BXO
78	4	16	15232	S30 W55	326	1500	3.0									
78	4	17	15232	S30 W67	324	1200	2.5									

MCMATH REGION 15245 CMP DATE 14.1

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	15	15245	N28 W18	302	200	1.5		N28 W17				R	10	1	AXX
78	4	16	15245	N28 W31	302	200	1.0									
78	4	17	15245	N28 W43	300	200	1.0									

MCMATH REGION 15239 CMP DATE 14.2

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	11	15239	N19 E33	301	200	2.5	20005	N19 E33	302	(AP)	1				
78	4	12	15239	N19 E22	301	300	3.0	20005	N19 E20	301	(B)	4				
78	4	13	15239	N19 E07	300	500	3.0		N17 E06				B	50	4	DSO
78	4	14	15239	N20 W04	301	600	3.0		N18 W08				B	40	6	CRO
78	4	15	15239	N20 W19	303	700	3.0		N19 W22				R	30	15	CRO
78	4	16	15239	N20 W33	304	700	3.0									
78	4	17	15239	N20 W46	303	700	3.0	20005	N20 W50	311	(AP)	3	B	40	2	CSO
78	4	18	15239					20005	N20 W74	312	(AP)	2				
78	4	19	15239	N20 W81	309	500	2.0	20005	N20 W85	314	AP	2				

MCMATH REGION 15233 CMP DATE 14.4 RETURN OF REGION 15178 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	7	15233	S35 E82	306	900	2.0									
78	4	8	15233	S32 E70	305	1500	2.0									
78	4	9	15233	S33 E60	302	1800	1.5	20001	S33 E51	308	(AP)	3				
78	4	10	15233	S33 E49	300	1800	2.0	20001	S34 E39	307	(AP)	2				
78	4	11	15233	S34 E35	299	1800	2.5	20001	S34 E28	307	(AP)	3				
78	4	12	15233	S33 E25	298	1800	2.0	20001	S35 E15	306	(AP)	2				
78	4	13	15233	S33 E10	297	2000	2.0									
78	4	14	15233	S33 E08	297	1800	2.5		S33 W10				B	10	1	AXX
78	4	15	15233	S33 W12	296	2000	2.5		S35 W18				R	10	2	BXO
78	4	16	15233	S33 W23	294	1800	2.5									
78	4	17	15233	S33 W35	292	1800	2.0									
78	4	19	15233	S33 W65	293	1500	1.5									

MCMATH REGION 15240 CMP DATE 14.8

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	13	15240	S20 E15	292	400	3.0		S20 E17				B	20	3	BXO
78	4	14	15240	S19 E04	293	500	3.0		S20 E04				B	80	11	DAI
78	4	15	15240	S19 W09	293	700	2.5		S20 W09				R	40	9	CRO
78	4	16	15240	S19 W22	293	600	2.5									
78	4	17	15240	S19 W35	292	600	2.5	20007	S20 W38	289	(AF)	2	B	20	2	HSX
78	4	18	15240					20007	S20 W50	288	(AF)	2	H	20	2	HRX
78	4	19	15240	S19 W64	292	800	3.0	20007	S17 W62	291	AF	1				

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15235 CMP DATE 15.6 RETURN OF REGION 15194 AND 15184 ROTATION 2 AND 7

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	8	15235	N16 E85	290	600	1.5									
78	4	9	15235	N16 E76	286	2500	3.0	20002	N15 E71	288	(BP)	2				
78	4	10	15235	N17 E68	281	5500	3.5	20002	N16 E58	288	(BP)	4				
78	4		15235					20003	N18 E72	274	(BP)	3				
78	4	11	15235	N17 E53	281	6200	3.5	20002	N15 E44	291	(BP)	4				
78	4		15235					20003	N17 E59	276	(B)	3				
78	4	12	15235	N17 E41	282	6500	3.5	20002	N14 E28	293	(D)	4				
78	4		15235					20003	N17 E44	277	(BY)	4				
78	4	13	15235	N17 E25	282	6000	3.0		N17 E31				B	130	5	DSO
78	4		15235						N14 E15				B	130	19	EAI
78	4	14	15235	N17 E16	281	6300	3.5		N15 E18				B	140	12	CSI
78	4	15	15235	N17 E01	283	6500	3.5		N18 E12				R	10	7	BXO
78	4		15235						N17 E06				R	200	24	ESI
78	4	16	15235	N17 W11	282	6300	3.5									
78	4	17	15235	N17 W23	280	5800	3.5	20002	N14 W45	296	(B)	3	B	140	15	DSI
78	4		15235					20003	N17 W28	279	(BF)	4	B	140	7	DSI
78	4	18	15235					20002	N14 W59	297	(D)	3	H	20	1	HSX
78	4		15235					20003	N18 W39	277	(AP)	4	H	170	13	DSI
78	4		15235						N17 W28				H	110	5	DSO
78	4	19	15235	N18 W54	282	5400	3.5	20002	N14 W68	297	(B)	3	B	270	9	DKO
78	4		15235					20003	N18 W49	278	(AP)	4	B	110	6	DAO
78	4	20	15235					20002	N14 W82	297	(AP)	2				
78	4		15235					20003	N18 W64	279	(AP)	3				
78	4		15235					20014	N19 W48	263	(B)	3				
78	4	21	15235	N18 W80	281	4000	3.0									
78	4	22	15235	N19 W90	281	1500	3.0	20003	N18 W85	272	(AP)	2				

MCMATH REGION 15254 CMP DATE 16.9

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	21	15254	N20 W64	265	1000	3.5									
78	4	22	15254	N20 W75	266	1400	3.5	20014	N19 W79	266	(B)	3				
78	4	23	15254	N20 W88	265	1200	2.5									

MCMATH REGION 15237 CMP DATE 17.3

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	10	15237	S25 E88	261	900	2.0									
78	4	11	15237	S25 E72	262	900	3.0									
78	4	12	15237	S25 E62	261	800	3.0									
78	4	13	15237	S26 E47	260	700	3.0									
78	4	14	15237	S26 E36	261	500	3.0									
78	4	15	15237	S26 E23	261	500	2.5									
78	4	16	15237	S26 E10	261	300	2.0									
78	4	17	15237	S26 W02	259	300	1.5									
78	4	19	15237	S26 W32	260	300	1.0									

MCMATH REGION 15256 CMP DATE 17.4

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	22	15256	S22 W68	259	100	1.0									
78	4	23	15256	S23 W79	256	200	1.0									

MCMATH REGION 15249 CMP DATE 18.0

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	19	15249	N41 W23	251	200	2.0		N40 W19				B	10	2	BXO
78	4	21	15249	N41 W49	250	100	1.0									

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15238 CMP DATE 18.3 RETURN OF REGION 15201 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	10	15238	S44 E89	260	500	1.0									
78	4	11	15238	S44 E78	256	700	3.0	20006	S44 E79	256	(AP)	2				
78	4	12	15238	S43 E69	254	1100	3.0	20006	S44 E67	254	(AP)	3				
78	4	13	15238	S43 E58	249	900	2.0		S45 E54				B	100	1	HSX
78	4	14	15238	S43 E49	248	1000	2.5		S43 E40				B	80	1	HSX
78	4	15	15238	S43 E36	248	1000	2.5		S43 E34				R	70	1	HSX
78	4	16	15238	S43 E23	248	800	2.5									
78	4	17	15238	S43 E10	247	700	2.0	20006	S44 E05	246	(AP)	4	B	60	1	HSX
78	4	18	15238					20006	S44 W05	243	(AP)	3	H	80	1	HSX
78	4	19	15238	S43 W15	243	800	2.0	20006	S44 W15	244	(AP)	4	B	70	1	HAX
78	4	20	15238					20006	S44 W28	243	(AP)	4				
78	4	21	15238	S43 W40	241	600	1.5									
78	4	22	15238	S43 W50	241	600	1.5	20006	S45 W53	240	(AP)	3				
78	4	23	15238	S43 W60	237	600	1.5	20006	S45 W67	239	(AP)	2	B	30	1	HRX
78	4	24	15238	S43 W72	234	300	1.0		S44 W82				B	20	1	HRX
78	4	25	15238	S43 W82	233	300	1.0									

MCMATH REGION 15247 CMP DATE 18.5

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	15	15247	S24 E43	241	300	1.0									
78	4	16	15247	S24 E27	244	200	1.0									

MCMATH REGION 15241 CMP DATE 19.1

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	13	15241	N14 E72	235	100	1.0									
78	4	14	15241	N15 E65	232	200	1.5									
78	4	15	15241	N15 E48	236	100	1.0									

MCMATH REGION 15242 CMP DATE 19.2 RETURN OF REGION 15185 (REMNANTS) ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	13	15242	N26 E71	236	200	2.0									
78	4	14	15242	N27 E65	232	500	2.5									
78	4	15	15242	N28 E49	235	400	2.0									
78	4	16	15242	N28 E36	235	400	2.0									
78	4	17	15242	N28 E23	234	400	2.0									
78	4	19	15242	N28 W07	235	500	1.0									
78	4	21	15242	N29 W33	234	300	1.0									
78	4	22	15242	N29 W42	233	400	1.0									
78	4	23	15242	N28 W55	232	400	1.5									

MCMATH REGION 15255 CMP DATE 20.7

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	21	15255	N18 W14	215	400	2.5									
78	4	22	15255	N18 W24	215	1300	3.0	20015	N18 W27	214	(B)	4				
78	4	23	15255	N17 W37	214	1500	3.0	20015	N18 W42	214	(B)	3	B	80	17	DSO
78	4	24	15255	N17 W54	216	2000	3.0		N19 W55				B	10	3	BXO
78	4	25	15255	N18 W65	216	1800	3.0		N18 W69				B	10	1	AXX
78	4	26	15255	N18 W77	216	1700	3.0									

MCMATH REGION 15243 CMP DATE 20.9

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	14	15243	N28 E85	212	600	1.5									
78	4	15	15243	N30 E70	214	800	3.5		N32 E67				R	60	4	CRO
78	4	16	15243	N30 E57	214	1200	3.5									
78	4	17	15243	N30 E44	213	1300	3.0	20008	N33 E41	210	(AF)	1	B	40	3	HRX
78	4	18	15243					20008	N33 E29	209	(AF)	2	H	20	4	CSO
78	4	19	15243	N31 E14	214	1300	3.0	20008	N30 E13	216	(AP)	2	B	10	1	BXO

(Con't)

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15243 (CONT) CMP DATE 20.9

				CALCIUM					SUNSPOT								
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	NW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	21	15243	N31	W12	213	900	2.5										
78	4	22	15243	N31	W21	212	900	2.0										
78	4	23	15243	N30	W34	211	800	2.0										
78	4	24	15243	N30	W50	212	800	2.0										
78	4	25	15243	N32	W62	213	600	2.0										
78	4	26	15243	N32	W74	213	500	1.5										

MCMATH REGION 15244 CMP DATE 21.7

				CALCIUM					SUNSPOT								
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	NW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	14	15244	N17	E89	208	700	1.0										
78	4	15	15244	N20	E76	208	1200	2.5		N17	E71				R	10	1	AXX
78	4	16	15244	N22	E65	206	1800	3.0										
78	4	17	15244	N21	E52	205	1600	2.5		N16	E56				B	10	1	AXX
78	4	18	15244							N17	E38				H	0	1	AXX
78	4	19	15244	N21	E22	206	2500	3.0										
78	4	21	15244	N22	W01	202	2800	2.0										
78	4	22	15244	N22	W10	201	2500	2.0										
78	4	23	15244	N21	W22	199	2200	2.0										
78	4	24	15244	N21	W37	199	1800	2.0										
78	4	25	15244	N22	W48	199	1700	2.0										
78	4	26	15244	N22	W61	200	1500	1.5		N22	W55				B	230	17	EKI
78	4	27	15244	N22	W75	199	1400	1.0										
78	4	28	15244	N28	W88	199	400	1.0										

MCMATH REGION 15246 CMP DATE 21.9 RETURN OF REGION 15211 ROTATION 2

				CALCIUM					SUNSPOT								
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	NW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	15	15246	S31	E80	204	700	2.5		S29	E79				R	20	3	BXO
78	4	16	15246	S31	E68	203	700	2.5										
78	4	17	15246	S31	E56	201	800	2.5	20009	S29	E52	199	(AP)	2	B	10	2	AXX
78	4		15246						20010	S29	E58	193	(AP)	2	B	20	1	HSX
78	4	18	15246						20009	S29	E34	204	(AP)	2				
78	4		15246						20010	S29	E49	189	(AP)	3	H	30	1	HSX
78	4	19	15246	S30	E26	202	1200	2.5	20009	S29	E24	205	(B)	3	B	60	12	DAI
78	4		15246						20010	S30	E40	189	(AP)	3	B	50	1	HSX
78	4	20	15246						20009	S30	E10	205	(B)	3				
78	4		15246						20010	S30	E25	190	(AP)	3				
78	4	21	15246	S30	E01	200	1000	2.5										
78	4	22	15246	S30	W09	200	1400	2.5	20009	S30	W11	198	B	1				
78	4		15246						20010	S30	W01	188	(AP)	3				
78	4	23	15246	S30	W19	196	1700	2.5	20010	S30	W15	187	(AP)	3	B	20	7	CRO
78	4		15246							S28	W26				B	10	3	BXO
78	4	24	15246	S30	W33	195	1700	3.0		S30	W30				B	40	4	DRO
78	4	25	15246	S30	W44	195	1800	3.0		S30	W46				B	90	7	DSO
78	4	26	15246	S30	W57	196	2300	3.0		S29	W62				B	80	2	DSO
78	4	27	15246	S30	W70	194	2400	3.0	20010	S30	W75	198	(B)	2				
78	4	28	15246	S30	W83	194	1500	2.5										
78	4	29	15246	S29	W90	189	300	1.0										

MCMATH REGION 15248 CMP DATE 22.9

				CALCIUM					SUNSPOT								
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	NW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	16	15248	N21	E85	186	800	1.0										
78	4	17	15248	N20	E71	186	900	2.0										
78	4	18	15248						20012	N22	E51	187	(B)	3	H	10	1	AXX
78	4	19	15248	N20	E41	187	3000	3.5	20012	N22	E41	188	(B)	4	B	100	16	DAI
78	4		15248						20013	N17	E43	186	(BY)	2	B	20	5	BXI
78	4	20	15248						20012	N22	E26	189	(B)	4				
78	4		15248						20013	N17	E27	188	(B)	3				
78	4	21	15248	N21	E15	186	4000	3.0										
78	4	22	15248	N20	E05	186	4000	3.0	20012	N21	W01	188	( )	4				
78	4		15248						20013	N16	E02	185	(BP)	3				
78	4	23	15248	N19	W09	186	4000	3.0	20012	N21	W15	187	(B)	4				
78	4		15248						20013	N15	W09	181	(B)	3	B	440	27	EAI
78	4		15248							N17	W10				B	160	14	CRO
78	4	24	15248	N19	W26	188	4500	3.0		N17	W22				B	80	13	DAX
78	4		15248							N21	W27				B	300	22	EKI
78	4	25	15248	N19	W37	188	4500	3.5		N14	W34				B	250	12	DAI
78	4		15248							N21	W39				B	350	13	EAI
78	4	26	15248	N19	W49	188	5100	3.5		N15	W50				B	220	17	DAO

(Con't)

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15248 (CONT) CMP DATE 22.9

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	27	15248	N19 W62	186	5500	3.0	20012	N22 W63	186	(B)	3	B	120	8	CSO
78	4		15248					20013	N16 W62	185	(B)	3	B	220	5	DSO
78	4	28	15248	N19 W76	187	4600	3.0	20012	N23 W80	190	(B)	2				
78	4		15248					20013	N16 W78	188	(B)	2	B	120	2	ESO
78	4	29	15248	N19 W88	187	2300	2.0									

MCMATH REGION 15250 CMP DATE 24.4

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	19	15250	N22 E61	167	300	2.0									
78	4	21	15250	N23 E35	166	200	1.0									
78	4	22	15250	N23 E25	166	500	2.5	20016	N24 E22	165	(Y)	3				
78	4	23	15250	N22 E12	165	500	2.0	20016	N24 E06	166	(B)	3	B	80	7	DRO
78	4	24	15250	N22 W05	167	400	2.5		N23 W04				B	20	4	CRO
78	4	25	15250	N23 W15	166	500	2.5		N23 W18				B	10	3	BXO
78	4	26	15250	N24 W27	166	600	2.5									
78	4	27	15250	N24 W41	165	500	2.0									
78	4	28	15250	N24 W55	166	500	2.0									
78	4	29	15250	N24 W67	166	500	2.0									
78	4	30	15250	N24 W82	168	200	1.0									

MCMATH REGION 15251 CMP DATE 24.4 RETURN OF REGION 15206 ROTATION 4

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	17	15251					20011	S18 E85	166	AP	2				
78	4	18	15251					20011	S19 E73	165	(AP)	3	H	90	1	HSX
78	4	19	15251	S17 E62	166	1200	3.5	20011	S19 E62	167	(AP)	4	B	130	2	HAX
78	4	20	15251					20011	S20 E47	168	(AP)	4				
78	4	21	15251	S17 E35	166	800	3.0									
78	4	22	15251	S18 E24	167	800	2.5	20011	S20 E21	166	(AP)	4				
78	4	23	15251	S18 E12	165	700	2.5	20011	S20 E06	166	(AP)	3	B	80	1	HSX
78	4	24	15251	S18 W03	165	1000	2.5		S20 W04				B	70	2	HKX
78	4	25	15251	S19 W15	166	1200	2.5		S20 W17				B	10	3	BXO
78	4	26	15251	S20 W27	166	1200	2.0									
78	4	27	15251	S20 W40	164	800	2.0									
78	4	28	15251	S20 W53	164	500	2.0									
78	4	29	15251	S20 W66	165	600	2.5									
78	4	30	15251	S20 W78	164	600	1.5									

MCMATH REGION 15253 CMP DATE 25.6 RETURN OF REGION 15218 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	19	15253	N11 E85	143	800	2.5									
78	4	21	15253	N11 E55	146	500	2.5									
78	4	22	15253	N11 E44	147	600	2.5									
78	4	23	15253	N11 E30	147	500	2.0									
78	4	24	15253	N11 E11	151	400	2.0									
78	4	25	15253	N11 E01	150	200	1.5									
78	4	26	15253	N11 W11	150	200	1.5									
78	4	27	15253	N11 W24	148	200	1.0									
78	4	28	15253	N12 W38	149	200	1.0									
78	4	29	15253	N12 W51	150	100	1.0									
78	4	30	15253	N12 W65	151	100	1.0									

MCMATH REGION 15259 CMP DATE 25.9 RETURN OF PART OF REGION 15210 ROTATION 5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	21	15259	N23 E52	149	200	1.0									
78	4	22	15259	N23 E42	149	200	1.0									
78	4	23	15259	N23 E30	147	200	1.0									
78	4	24	15259	N23 E15	147	200	1.5									
78	4	25	15259	N24 E04	147	200	1.0									
78	4	26	15259	N24 W08	147	300	1.0		N27 W03				B	20	4	CSO
78	4	27	15259	N24 W22	146	300	1.0									
78	4	28	15259	N24 W35	146	300	1.0									
78	4	29	15259	N24 W47	146	200	1.0									
78	4	30	15259	N24 W59	145	200	1.0									

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15271 CMP DATE 25.9

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	29	15271	N36 W48	147	200	1.5									
78	4	30	15271	N36 W60	146	200	1.5									

MCMATH REGION 15252 CMP DATE 26.2 RETURN OF REGION 152Ø5 AND NEW ROTATION 1 AND 4

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	19	15252	S27 E80	148	700	1.0									
78	4	21	15252	S27 E55	146	400	1.0									
78	4	22	15252	S27 E45	146	500	2.0									
78	4	23	15252	S27 E32	145	500	1.5									
78	4	24	15252	S27 E19	143	700	2.0									
78	4	25	15252	S27 E06	143	700	2.0									
78	4	26	15252	S27 W06	145	400	1.5									
78	4	27	15252	S27 W20	144	400	1.5									
78	4	28	15252	S27 W33	144	400	1.0	20021	S32 W18	128	X	1				
78	4	29	15252	S27 W45	144	700	2.0									
78	4	30	15252	S27 W58	144	800	3.0									
78	5	01	15252	S27 W70		1000	4.0	20022	S27 W71		(8)	3	B	80	7	F
78	5	02	15252	S28 W83		1400	4.0	20022	S29 W76		(8)	2	B	140	7	D
78	5	03	15252	S30 W90		1200	4.0									

MCMATH REGION 15265 CMP DATE 26.8

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	24	15265	N29 E28	134	200	1.0									
78	4	25	15265	N29 E17	134	500	2.0		N27 E12				B	10	2	AXX
78	4	26	15265	N29 E04	135	600	2.0									
78	4	27	15265	N29 W10	134	800	2.5	20017	N29 W11	134	(BP)	4	B	20	6	CSO
78	4	28	15265	N30 W22	133	800	2.5	20017	N28 W27	137	(AP)	3	B	20	1	HSX
78	4	29	15265	N30 W34	133	800	2.5	20017	N28 W41	137	AP	3	B	20	1	HRX
78	4	30	15265	N30 W47	133	800	2.5		N32 W12				R	10	1	AXX
78	5	01	15265	N30 W59		500	2.5						B	10	1	A
78	5	02	15265	N30 W73		500	2.5									

MCMATH REGION 15260 CMP DATE 27.1 RETURN OF REGION 15226 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	21	15260	N12 E78	123	200	1.0									
78	4	22	15260	N12 E63	128	100	1.0									
78	4	23	15260	N12 E49	128	200	1.0									
78	4	24	15260	N12 E32	130	200	1.5									
78	4	25	15260	N12 E20	131	300	1.5									
78	4	26	15260	N12 E08	131	100	1.0									

MCMATH REGION 15261 CMP DATE 27.9 RETURN OF PART OF 152Ø5 ROTATION 4

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	22	15261	S34 E68	123	300	1.0									
78	4	23	15261	S34 E54	123	400	1.0									
78	4	24	15261	S34 E38	124	500	1.0									
78	4	25	15261	S34 E30	121	300	1.0									
78	4	26	15261	S33 E19	120	300	1.0									

MCMATH REGION 15257 CMP DATE 28.2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	4	22	15257	S23 E79	112	200	1.5									
78	4	23	15257	S23 E65	112	200	2.5									
78	4	24	15257	S23 E48	114	200	1.5									
78	4	25	15257	S23 E36	115	200	2.0		S24 E40				B	10	1	AXX
78	4	26	15257	S23 E22	117	300	1.5		S22 E16				B	10	2	BXO
78	4	27	15257	S23 E09	115	100	1.5									

(Con't)

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15257 (CONT) CMP DATE 28.2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	4	28	15257	S23 W02	113	100	1.0								
78	4	29	15257	S23 W16	115	100	1.0								

MCMATH REGION 15284 CMP DATE 28.2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	5	03	15284	N11 W69		500	1.5								
78	5	04	15284	N11 W83		500	1.5								

MCMATH REGION 15273 CMP DATE 28.3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	5	01	15273	S30 W41		200	1.0								

MCMATH REGION 15267 CMP DATE 29.1

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	4	25	15267	S25 E46	105	200	1.5								
78	4	26	15267	S25 E33	106	100	1.0								
78	4	27	15267	S25 E20	104	100	1.0								

MCMATH REGION 15262 CMP DATE 29.3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	4	23	15262	N01 E80	97	200	1.0								
78	4	24	15262	N01 E62	100	200	1.5								
78	4	25	15262	N01 E50	101	200	1.5								

MCMATH REGION 15268 CMP DATE 29.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	4	26	15268	S17 E40	99	100	1.5								

MCMATH REGION 15277 CMP DATE 30.0

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	5	01	15277	N31 W20		200	1.5					B	20	3	C
78	5	02	15277	N31 W34		300	2.0					B	10	2	B
78	5	03	15277	N32 W47		200	1.0								

MCMATH REGION 15263 CMP DATE 30.3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	5	01	15263	N17 W16		600	2.0								

MCMATH REGION 15264 CMP DATE 30.6 RETURN OF REGION 15216 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS
78	4	24	15264	S20 E85	77	200	1.0								
78	4	25	15264	S20 E72	79	200	1.5								
78	4	26	15264	S20 E55	84	300	1.5								

(Con't)

REGIONS OF SOLAR ACTIVITY

APRIL 1978

MCMATH REGION 15264 (CONT) CMP DATE 30.6 RETURN OF REGION 15216 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT CLASS
78	4	27	15264	S19 E43	81	200	1.0							
78	4	28	15264	S19 E30	81	300	1.0							
78	4	29	15264	S19 E16	83	200	1.0							
78	4	30	15264	S19 E01	85	200	1.0							
78	5	01	15264	S20 W11		300	1.0							

DAILY CALCIUM PLAGE INDEX

APRIL 1978

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
78	4	1	22.3	78	4	11	44.2	78	4	21	27.7
78	4	2	23.4	78	4	12	42.3	78	4	22	30.2
78	4	3	*	78	4	13	35.8	78	4	23	28.3
78	4	4	32.3	78	4	14	39.4	78	4	24	28.6
78	4	5	35.4	78	4	15	39.5	78	4	25	31.4
78	4	6	*	78	4	16	36.8	78	4	26	33.4
78	4	7	41.6	78	4	17	32.0	78	4	27	33.8
78	4	8	40.0	78	4	18	*	78	4	28	33.9
78	4	9	32.5	78	4	19	35.7	78	4	29	38.8
78	4	10	37.6	78	4	20	*	78	4	30	43.7

* NO OBSERVATIONS

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on April 3, 6, 18 and 20, 1978. No sunspot observations were made at Mt. Wilson on April 2, 3, 4, 6, 7, 8, 13, 14, 15, 16, 21, 24, 25, 26 and 30, 1978.

SUDDEN IONOSPHERIC DISTURBANCES

APRIL 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
01	0822	0832	0825	1-	1				1				NF	
02	0106	0202	0114	1-	1				1				0107	15221
02	0313	0438	0320	1-	1				1				0307E	15214
02	1209	1245	1215	2	5	2	1	7	3		3		NF	
02	1720	1745	1725	1-	3				1		14		1718	15221
04	0256	0412	0313	1-	1				1				----	X-RAY
04	0914	0925	0918	1-	1			1	1				0915E	15221
04	2114	2340	2206	1+	1				1				----	X-RAY
04	2143	2330	2206	1+	5	1			2	1	7		2142	15221
05	0255	0423	0340	1-	1				1				0339	15221
05	0616	0708	0618	1-	5				2		1		0615	15221
05	0750	0832	0758	1-	5			1	3				0750	15221
05	0912	0944	0916	1	5	2		3	4		2		0915E	15221
05	1358	1408	1358	1-	1				1				1353	15221
05	1728	1740	1733	1-	3						11		1728	15221
06	0942	1040	1011	1+	5	1		1	4		2		----	X-RAY
06	1859	1930	1905	1-	3						2		1858	15221
06	2352	0015	2357	1-	1				1				2356	15221
07	0500	0611	0517	1-	1				1				0528	15221
07	0642	0806	0650	1-	1				1				0707	15221
07	1140	1205	1147	1	5	2		4	3		3		1140	15221
07	1255	1429	1323	1	3			2					NF	
07	1622	1645	1625	1-	3						10		1618	15221
07	1845	1930	1855	1	5				2		13		1840	15221
07	1921	1939	1923	1-	3				1		7		1917	15221
07	2001	2012	2004	1-	5	1			2		10		2016	15221
07	2015	2047	2020	1	5	3			2		12		2016	15221
07	2135	2204	2139	1-	3				1		4		----	X-RAY
08	0124	0604	0234	3	5	1			1		1		0120	15221
08	0805	0853	0811	2	5	3	1	5	3		2		*	
08	1105	1123	1111	1	5				3		2		*	
08	1122	1205	1127	1+	5	3		5	4		3		*	
08	1205	1245	1210	1-	3				1		2		1206	15214
08	1418	1423D	1423	1-	3						2		*	
08	1437	1504	1446	1-	5			1	2		10		----	X-RAY
08	1826	1838	1830	1-	3						3		1826	15221
08	1903	1918	1906	1-	3				1		7		1856	15214
08	2214	2302D	2220	1-	3				2				----	X-RAY
08	2302	2340	2314	1-	5				2		6		----	X-RAY
09	0040	0143	0048	1	5	1		1	1		1		----	X-RAY
09	0210	0312D	0220	1-	5	1		1	1		1		0215E	15214
09	0312E	0423D	0322	1	3			1	1		1		0316	15221
09	0423E	0606D	0457	1+	3	2			1				0422	15214
09	0606E	0747D	0620	1	1				1				NF	
09	0744	0854	0757	1-	3				1		1		0755E	15214
09	1200	1250	1208	1-	5	1			3		1		1159	15221
09	1317	1530	1335	1-	1				1		1		1321	15221
09	2147	2306	2158	1+	5	2	1		2	1	13		2149E	15235
10	0113	0148	0126	1-	1				1				----	X-RAY
10	0220	0317D	0229	1-	3	1			1		1		----	X-RAY
10	0523	0733	0538	1-	5	1			2				NF	
10	1053	1100	1215	3	5	4	1	6	4		3		NF	
10	1210	1230	1213	2	1			1					*	
10	1435	1451	1437	1-	3	2			1				1419	15239
10	1454	1610	1508	1	5			5	3		15		*	
10	1518	1542	1523	1-	5	1			1		8		1519	15239
10	1608	1640	1614	1+	5	3		6	3		17		1609	15239
10	1704	1745	1715	1+	5	2		2	2		15		1706	15239
10	1924	2000	1938	1	3						13		1919	15239
10	2236	2300	2239	1	1	1							2230	15227
10	2306	2345	2314	1-	1				1				2304	15227

SUDDEN IONOSPHERIC DISTURBANCES

APRIL 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
11	0055	0145	0058	1-	1				1				0053	15239
11	0223	0248	0230	1-	1				1				0226	15221
11	0302	0409D	0306	1-	1				1				0300	15221
11	0408	0601D	0418	1	3	1			1		1		0410	15221
11	0601E	0700D	0612	1	1				1				----	X-RAY
11	0700E	0741D	0709	1-	5	1			3		1		----	X-RAY
11	0741E	0850	0748	1-	5				3		1		----	X-RAY
11	0930	0938D	0938	1-	3			1	1				*	
11	0951	0955D	0955	1	5			3	4		3		----	X-RAY
11	1022	1027D	1027	1	5			1	3		2		----	X-RAY
11	1043	1052D	1052	1-	5			2	3		1		----	X-RAY
11	1057	1125	1104	1+	5	2		3	1		1		----	X-RAY
11	1159	1300	1212	2	5			4	2		1		NF	
11	1344	1705	1418	3+	5	5	2	7	3		17		1340	15221
11	1401	1800D	1415	3	5	2		1	1		9		1438	15239
11	2119	2202	2123	1-	3				1		5		2106	15239
11	2307	2354	2311	1-	1				1				NF	
12	0116	0210	0134	1-	1				1				NF	
12	0222	0400	0228	1-	3	1			1				*	
12	0450	0612	0510	1-	3	1			1				NF	
12	0642	0720	0649	2	5	3		3	3		2		0644	15221
12	0740	0822	0743	2	5	2		2	2		2		0740	15235
12	0910	0937	0920	1-	5			1	2		1		0909	15235
12	1736	1810	1746	1-	5			1	1		14		1737	15235
12	2344	0200	0046	1-	1				1				NF	
13	0018	0145	0032	1-	3	1			1				NF	
13	0443	0656	0459	2	3	1			1		1		0450	15235
13	0707	0717	0712	1-	5				2		1		0706	15239
13	1030	1052	1038	1	3		1	1					NF	
13	1209	1227	1213	1	3			2					---	X-RAY
13	1437	1520	1451	2	5	4	1	6	2		16		1439	15221
13	1713	1807	1727	1	3	1					7		1706	15235
13	2050	2132	2101	1-	3						7		*	
13	2335	0018D	2342	1-	5				2		3		2340	15221
14	0756	0815	0759	1-	5				3				----	X-RAY
14	0841	0940	0847	1	5	2		1	3		2		*	
14	1015	1100	1025	1	5	2		1	3		2		*	
14	1104	1145	1111	1	5	2		2	3		2		1059	15239
14	1706	1750	1715	1-	3						12		----	X-RAY
14	1803	1842	1805	1	3	1		1			14		----	X-RAY
14	2241	0057D	2252	2	5	3		1	2	1	14		2230	15227
15	0057E	0155D	0118	1-	1				1				NF	
15	0538	0543	0541	1-	3			2	1				NF	
15	0631	0715	0647	2	5	3		2	2		1		0631	15239
15	0812	0915	0817	2	5	3		4	2		2		0814	15239
15	1146	1210	1152	1	5	3		2	1		2		1146	15239
15	1224	1243	1232	1-	3	1	1		1		1		1222	15235
16	0919	1010	0924	2+	5	3		5	3		3		0919	15239
16	1151	1230	1211	1-	3	1			1				1153	15239
17	0519	0700	0525	1+	1				1				NF	
18	0107	0330	0122	2+	3	1		1	1		1		0109	15239
18	1246	1313	1255	1	5	2		3	2		2		----	X-RAY
18	1350	1430	1354	1	5	1		4	1		6		----	X-RAY
18	1518	1533	1525	1	5				1		4		NF	
19	0657	0957	0720	1+	5	1		1	3				0654	15244
19	0921	0933	0926	1-	3				1		1		*	
21	0731	0818	0740	2	5	2		1	2				NF	
21	2015	2035	2025	1-	3	2					14	2021		15244
22	0606	0626	0614	1	1				1				0618	15235
22	0648	0702	0653	1-	1				1				0649	15254
22	1307	1320	1311	1-	1				1				1300	15255

SUDDEN IONOSPHERIC DISTURBANCES

APRIL 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
23	0402	1148	0524	2+	5			2	1				----	X-RAY
23	1025	1115	1028	2	1			1					NF	
23	1745	2000D	1810	2+	1	1							NF	
23	2016	2323	2035	2+	5	3	1	2	2	1	15		2016	15248
24	0130	0158	0140	1-	1				1				----	X-RAY
24	0326	0411	0336	1-	1				1				----	X-RAY
24	0442	0538D	0505	1-	1				1				----	X-RAY
24	0538	0600	0543	2	3				2				----	X-RAY
24	1325	1405	1335	1	3		1		1		1		NF	
24	2206	2252	2212	1-	1				1				NF	
25	0108	0140	0120	1-	1				1				0111E	15266
25	0304	0346	0314	1-	1				1				0326	15266
25	0451	0630	0500	1-	1				1				----	X-RAY
25	1324	1410	1342	1	5	1		1	2		2		1320	15266
25	1420	1505	1432	1+	5	1		2	3		15		1420	15266
25	1534	1650	1553	2	5	5	2	5	4		17		1535	15266
25	1619	1630D	1630	1	5			1	1		8		1603	15266
25	2212	2249	2218	1-	5				2				2210	15266
26	0744	0758	0749	1-	1					1			0727	15246
26	0824	0855	0835	1	3			1	1		1		*	
26	1040	1105	1049	1	1				1				*	
26	1243	1400	1253	1	1				1		1		NF	
26	1342	1420	1352	1	5			2	2		11		1339	15266
26	1858	1920	1903	1-	5			1	1		13		1855	15266
26	1938	1945D	1945	1	3	1		1			2		1920	15266
26	1943	2112	2002	1+	5	4	1	1	2		18		1940	15266
26	2202	2301D	2216	1-	3				1		2		2203	15266
26	2301E	2350	2311	1-	3				1		2		NF	
27	0052	0124	0057	1-	1				1				*	
27	0311	0352	0312	1-	1				1				NF	
27	0418	0554	0432	1-	1				1				*	
27	0452E	0523	0455	1-	1				1				*	
27	1011	1125	1017	2	5	3		4	4		3		----	X-RAY
27	1926	2004	1932	1	5	2		1	1		10		1923	15266
27	2023	2027D	2027	1-	5			1			6		NF	
27	2045	2130	2050	1-	5	1			2		7		2046	15266
27	2144	2226	2200	1	5	1			2		7		*	
27	2315	2355	2322	1-	5				2		2		NF	
28	0010	0130	0017	1-	5	1			2		2		0010	15266
28	0643	0746	0649	1-	5				2		1		----	X-RAY
28	1306	1800	1332	3+	5	6	2	7	3		13		1304	15266
29	0442	0512	0447	1-	1				1				0442	15266
29	1145	1150D	1150	1-	1				1		1		*	
29	1634	1700	1644	1-	5	1		1	2		12		1629	15266
29	1818	1830D	1830	1+	5	2			2		14		1755	15266
29	1854	2126D	1922	3	5	2	1	1	3	1	16		----	X-RAY
29	2125	2220	2133	1	5			1	2		11		*	
30	0108	0146	0116	1-	1				1				0108	15266
30	0207	0314	0214	1-	1				1				*	
30	0419	0540	0438	1-	1				1				----	X-RAY
30	0844	0945D	0858	1	5	3		3	3		1		*	
30	0948	1035	0953	1	5	2	1	2	4		3		*	
30	1109	1135	1115	1	5	1		2	2		1		*	
30	1220	1250	1226	1-	1				1		1		1218	15266
30	1324	1339D	1339	1	5	1		2	3	1	10		1320	15266
30	1423	1436D	1436	1+	5	1		2	2		14		1420	15266
30	1443	1630	1457	3	5	5	2	7	4	1	12		1437	15266
30	2235	2320D	2246	1-	1				1				2234	15266

SUDDEN IONOSPHERIC DISTURBANCES

APRIL 1978

PERIODS OF NO OBSERVATIONS:

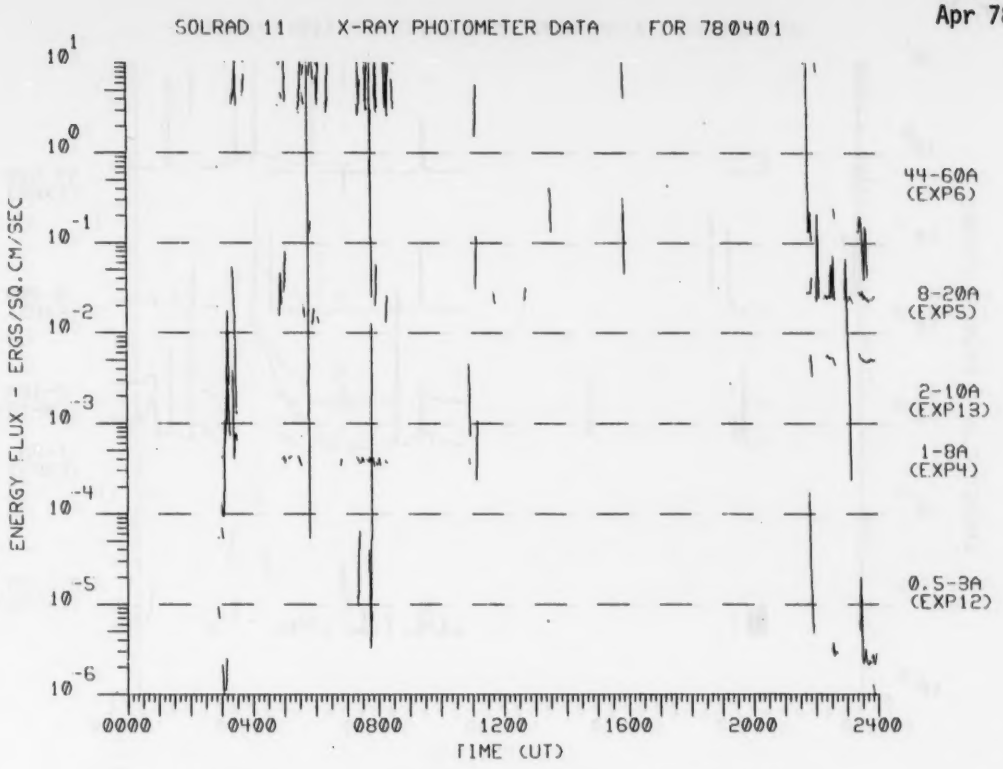
DATE	TIME (UT) and STATION
01-08	0000-2400 A46
03	1541-1600 TM
04	0000-2400 TN
07	0000-2400 A28
10	1216-1346 TM
15	0000-2400 TN
19-20	0000-2400 A37
21	1358-1428 TM
22	0000-2400 A37
24	1820-1850 TM
25	1520-1532 TM
26-27	0000-2400 A40
26-30	0000-2400 A30
30	0000-2400 A35

STATIONS REPORTING FOR APRIL 1978

AAVSO (A1, A5, A19, A21, A26, A28, A30, A34, A35, A37, A40, A45, A46) (SES) (A1, A31) (SES) (A31) (SWF)
CHILWORTH (CL) (SCNA)
DARMSTADT (DA) (SWF)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA, SES)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
KUHLUNGSBORN (KU) (SEA, SPA)
JULIUSRUH (JU) (SWF)
MC MATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SES, SEA)
PRESTON (LO) (SEA)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SEA)
SOMERTON (SO) (SWF)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
UPICE (UI) (SEA)
VSETIN (VA) (SEA)

SIDs BY McMATH REGION

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
REGION																															
15214		1						2	3																						
15221		2		2	6	2	8	2	3		4	1	2																		
15227										2				1																	
15235									1			3	2		1							1									
15239										5	3		1	1	3	2		1													
15244																			1		1										
15246																										1					
15248																							1								
15254																						1									
15255																						1									
15266																									7	5	2	2	3	6	
X-RAY				2		1	1	3	1	2	7		1	3				2					1	4	1		1	1	1	1	
UNKNOWN	1	1					1		1	2	2	3	2		2		1	1		1		2	2		2	3					
NO FP								4		2	1	1	1	2					1						2	4		2	4		


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780401
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-1}
10^{-2}
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10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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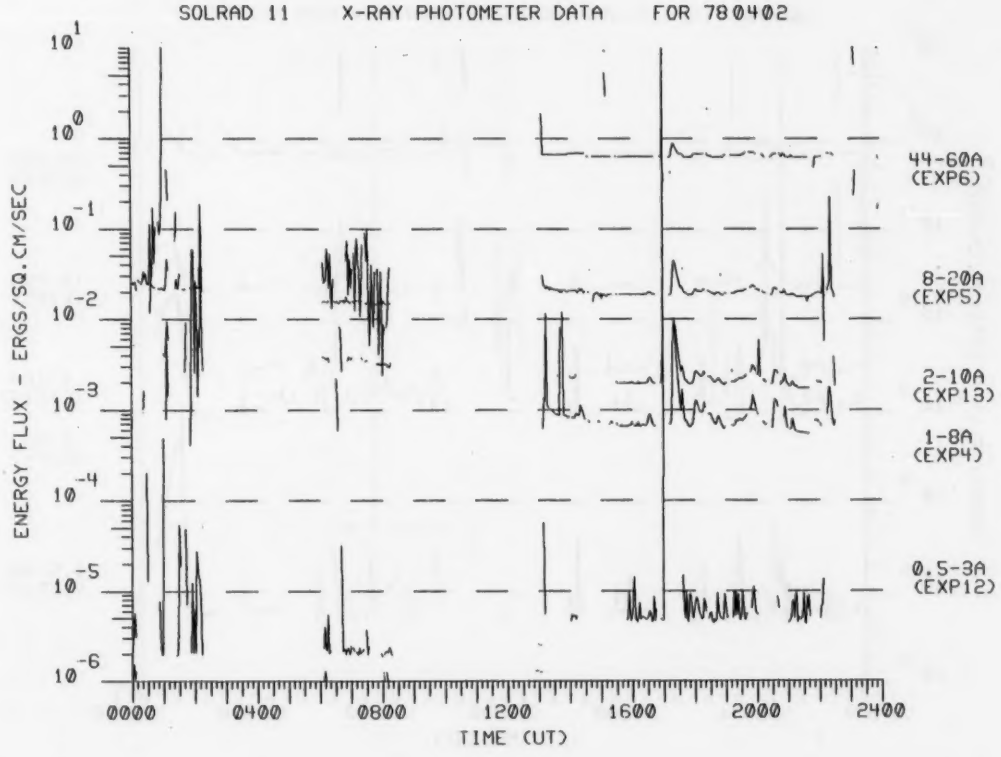
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780402
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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2000
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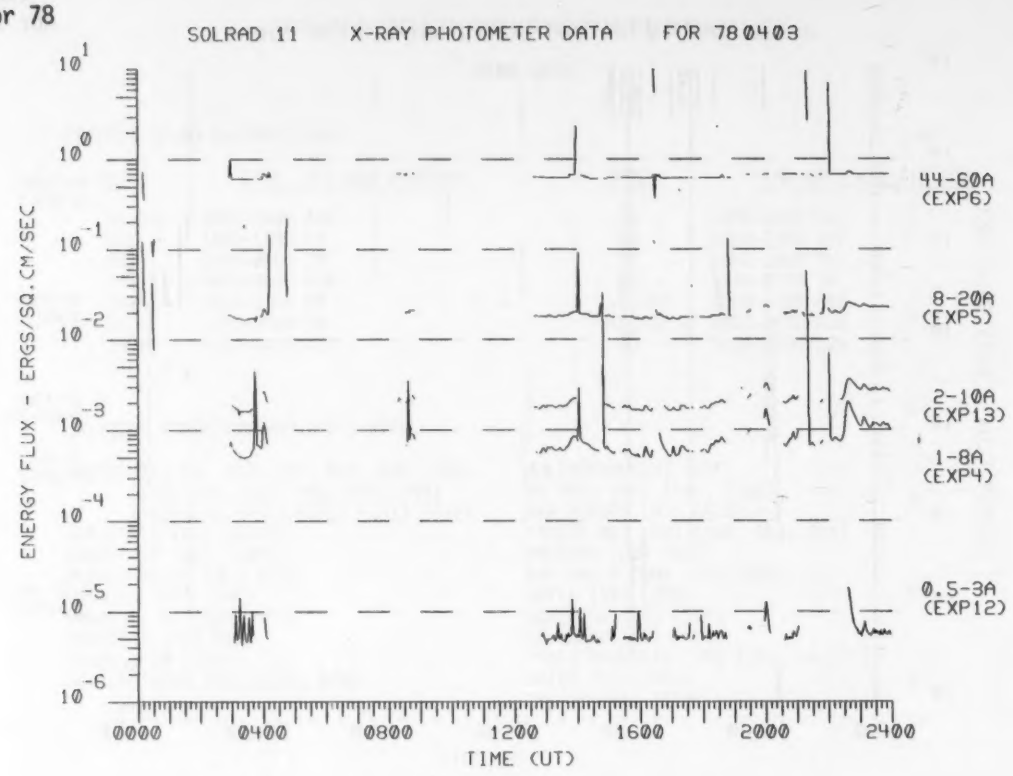
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780403
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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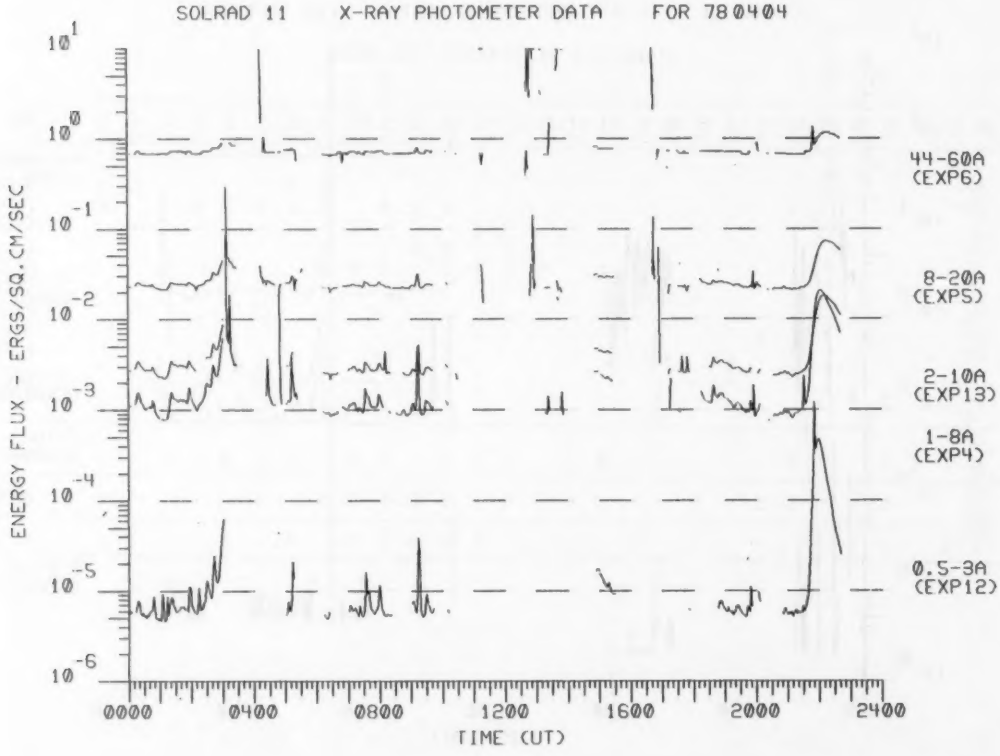
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780404
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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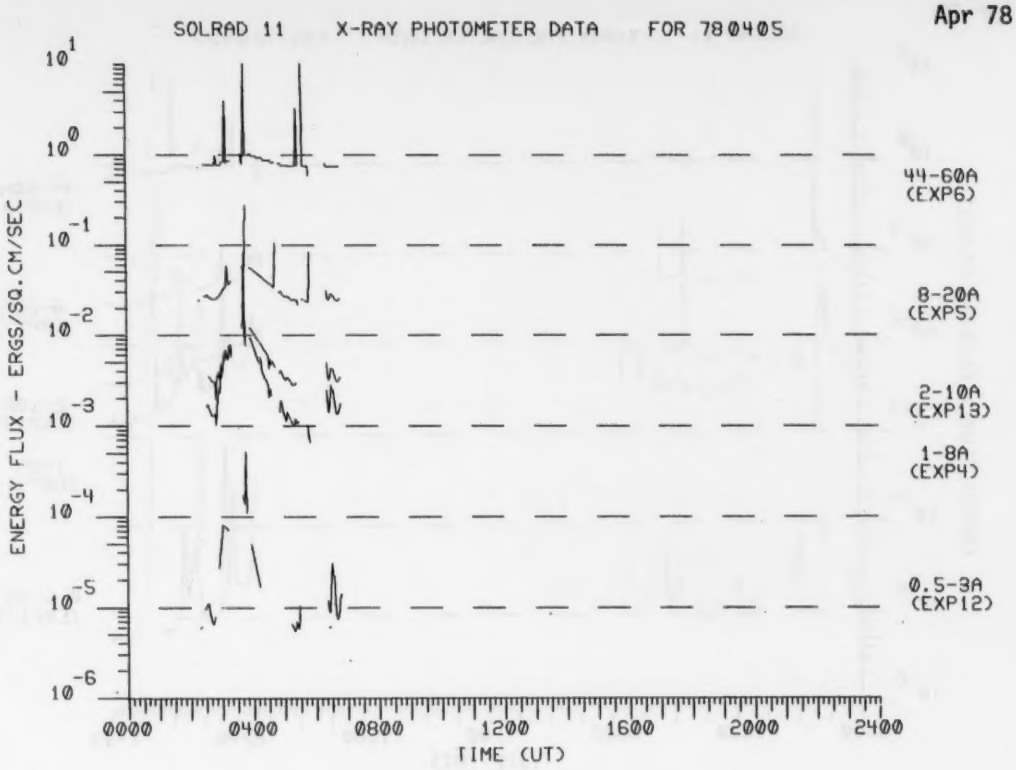
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780405
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
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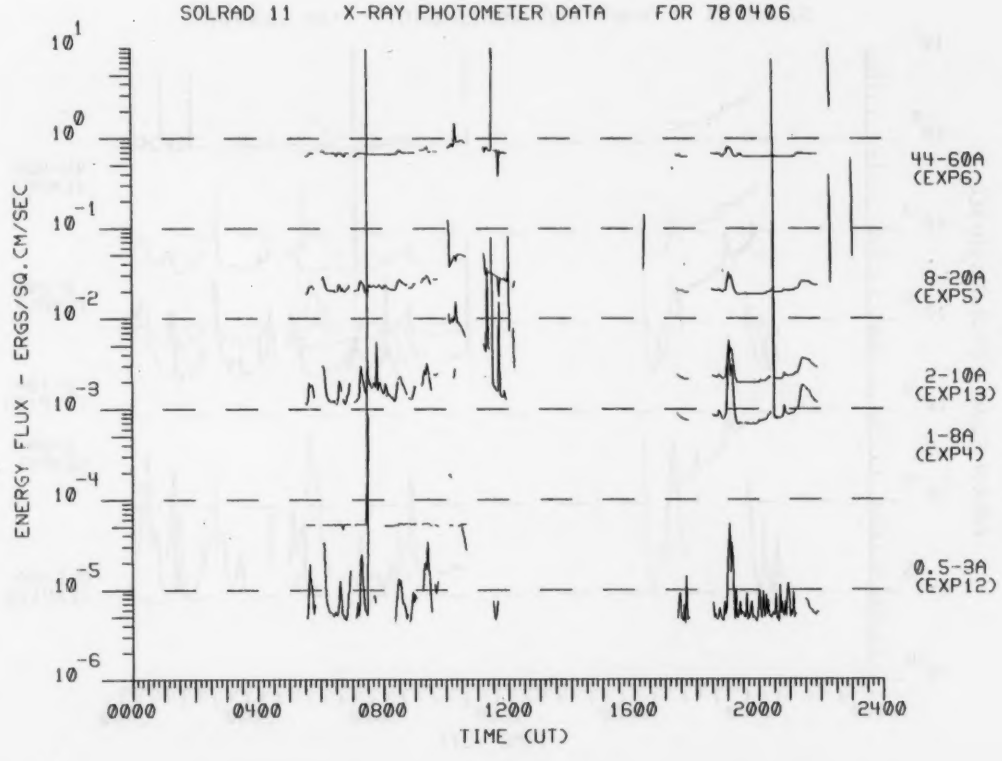
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780406
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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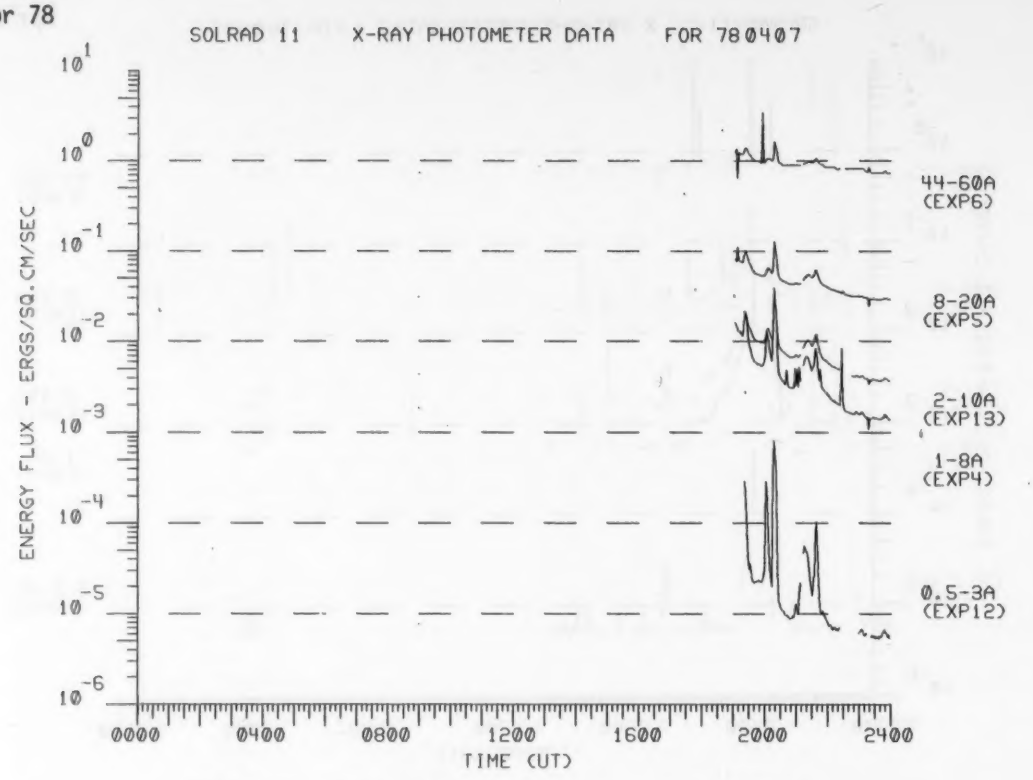
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780407
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-1}
10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
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0800
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1600
2000
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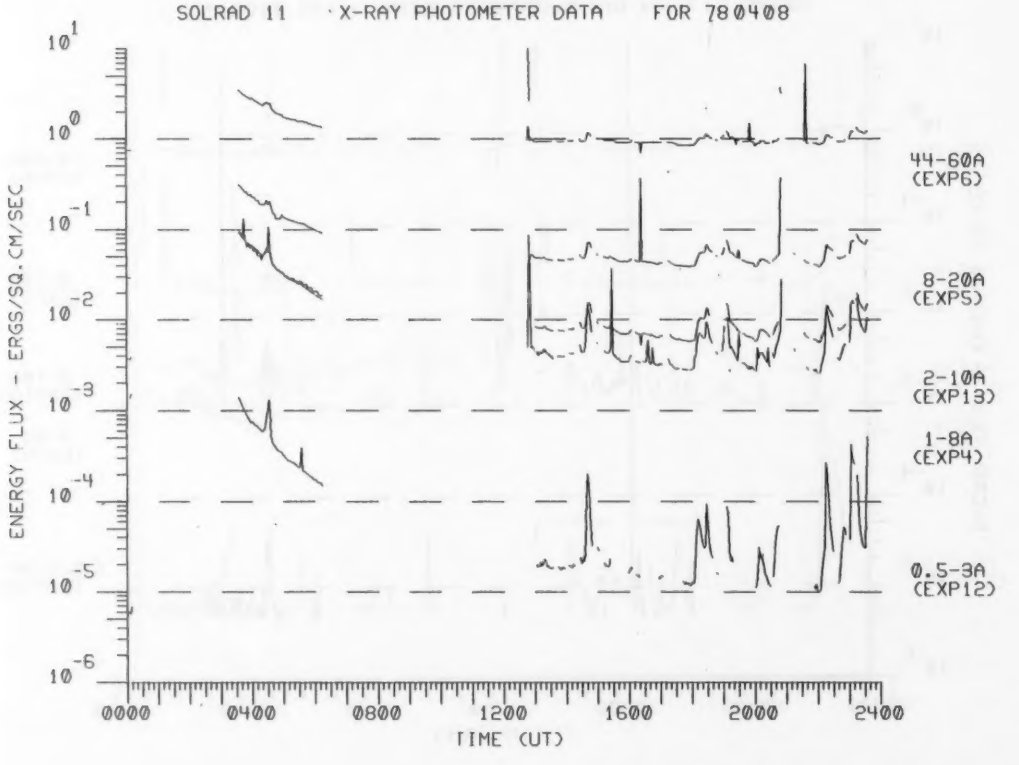
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780408
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
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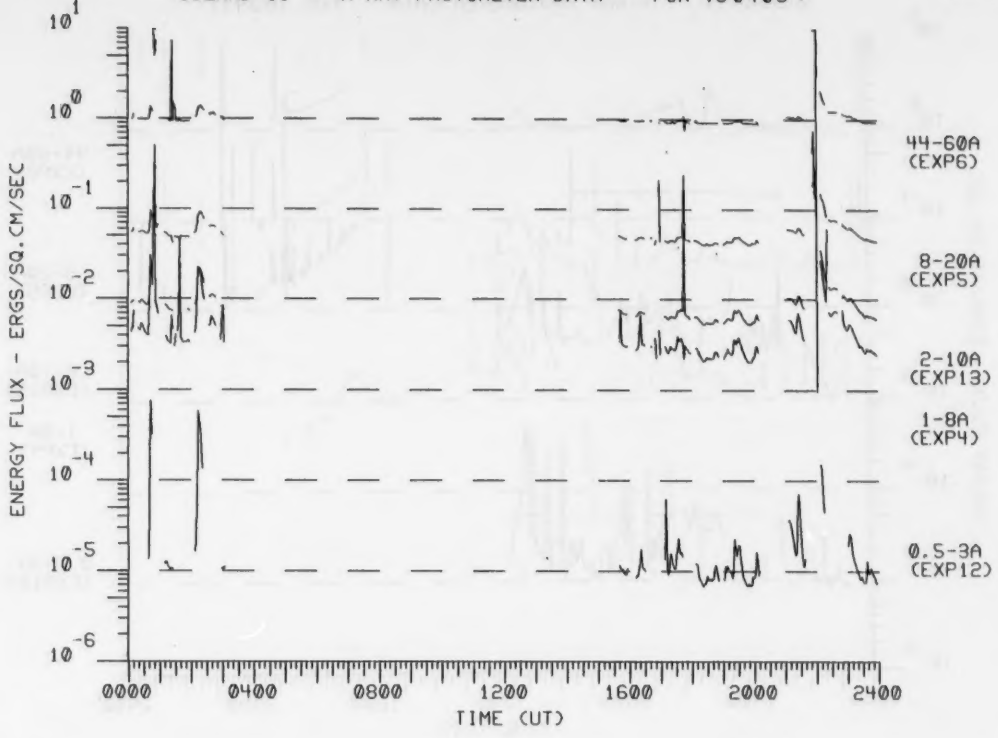
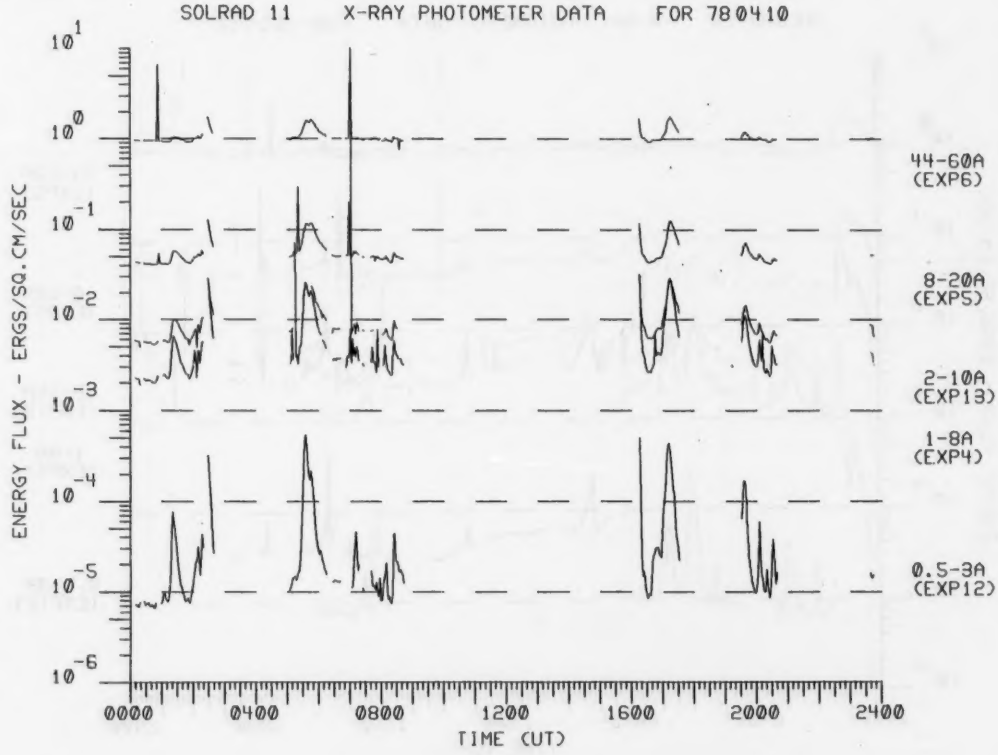
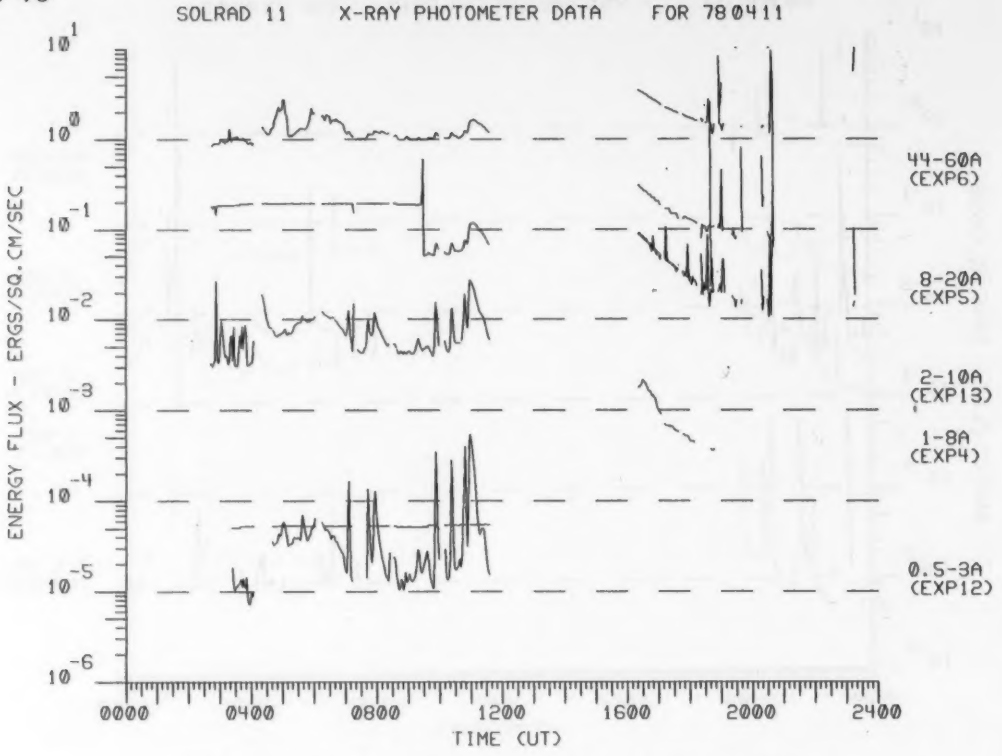
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780409



SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780410




SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780411
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
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0800
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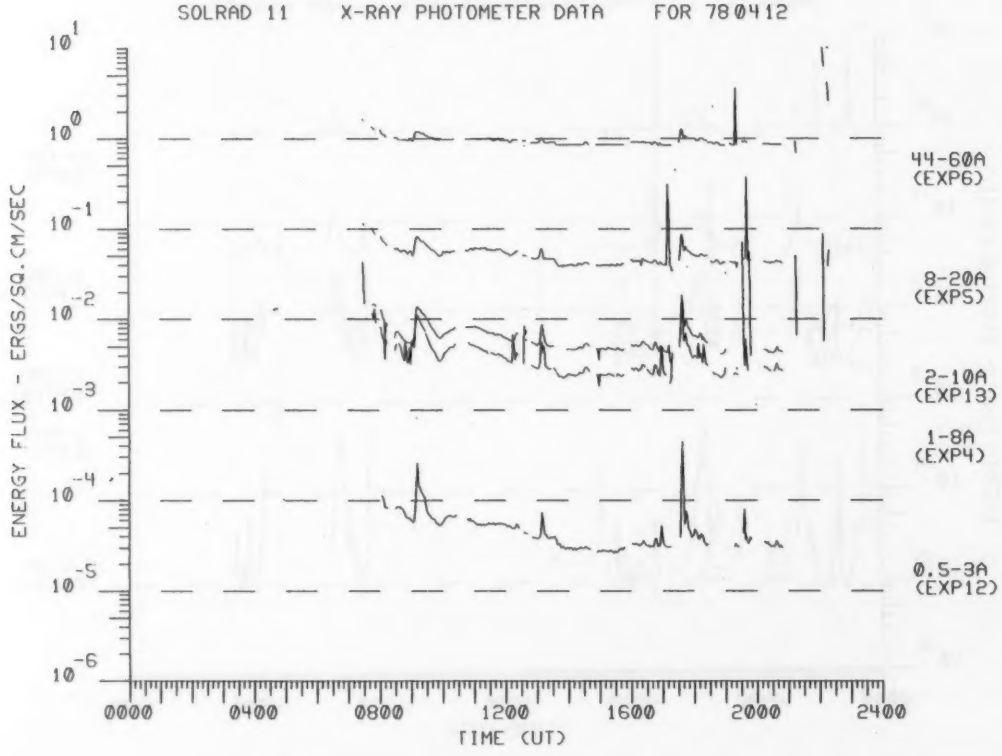
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780412
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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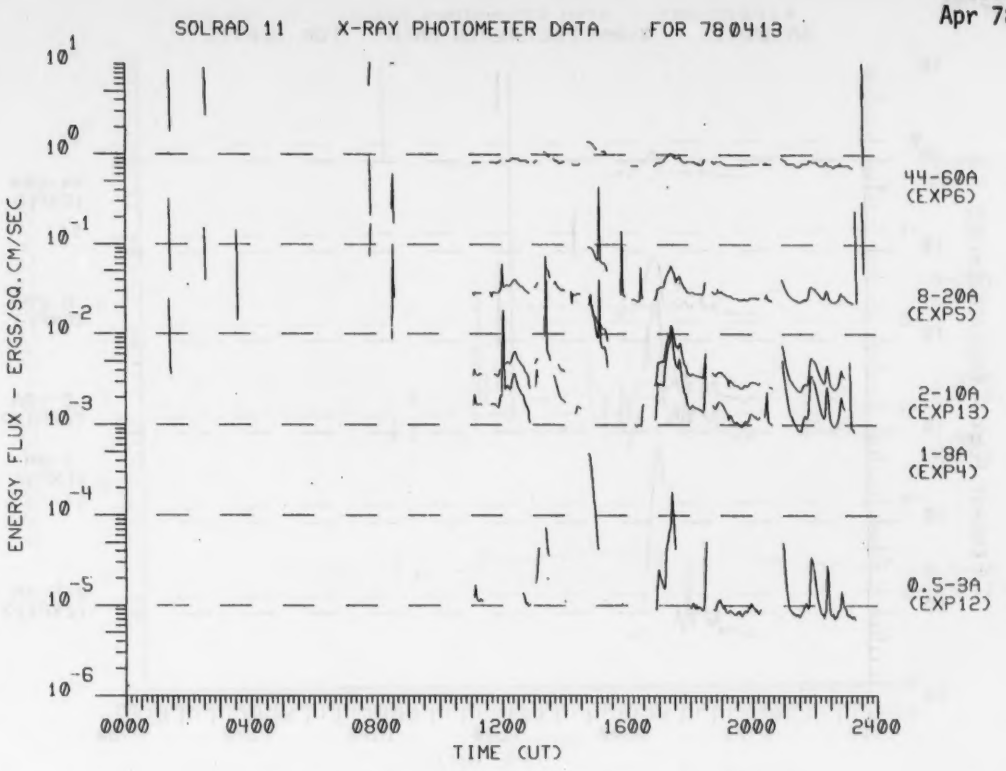
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780413
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-1}
10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
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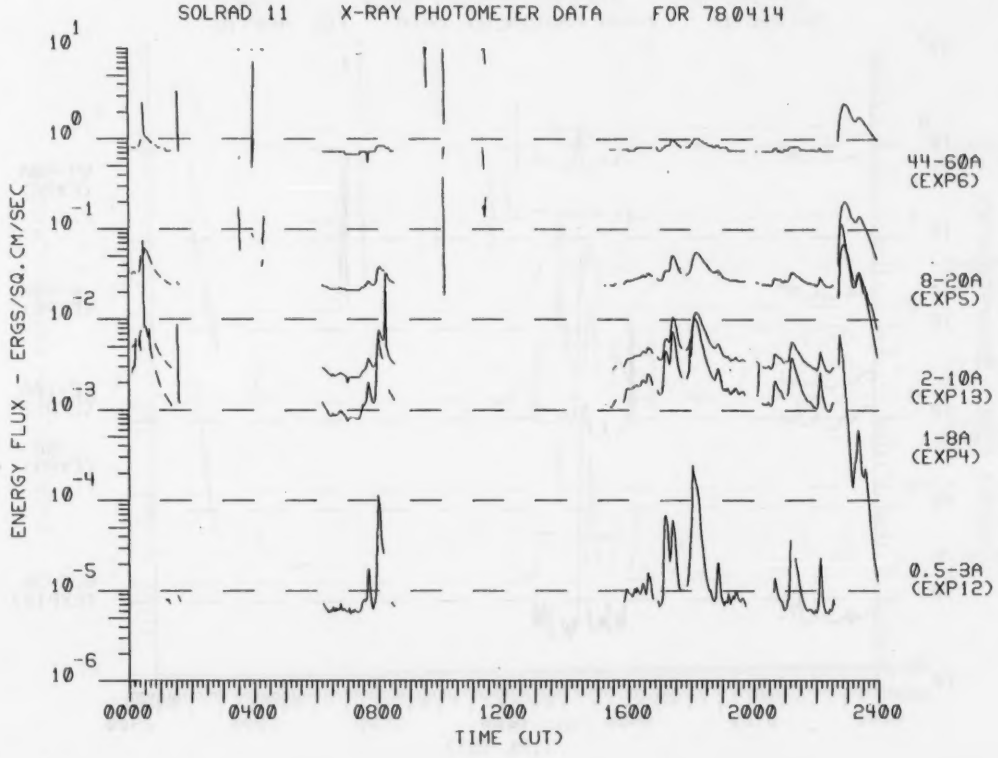
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780414
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-1}
10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
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0800
1200
1600
2000
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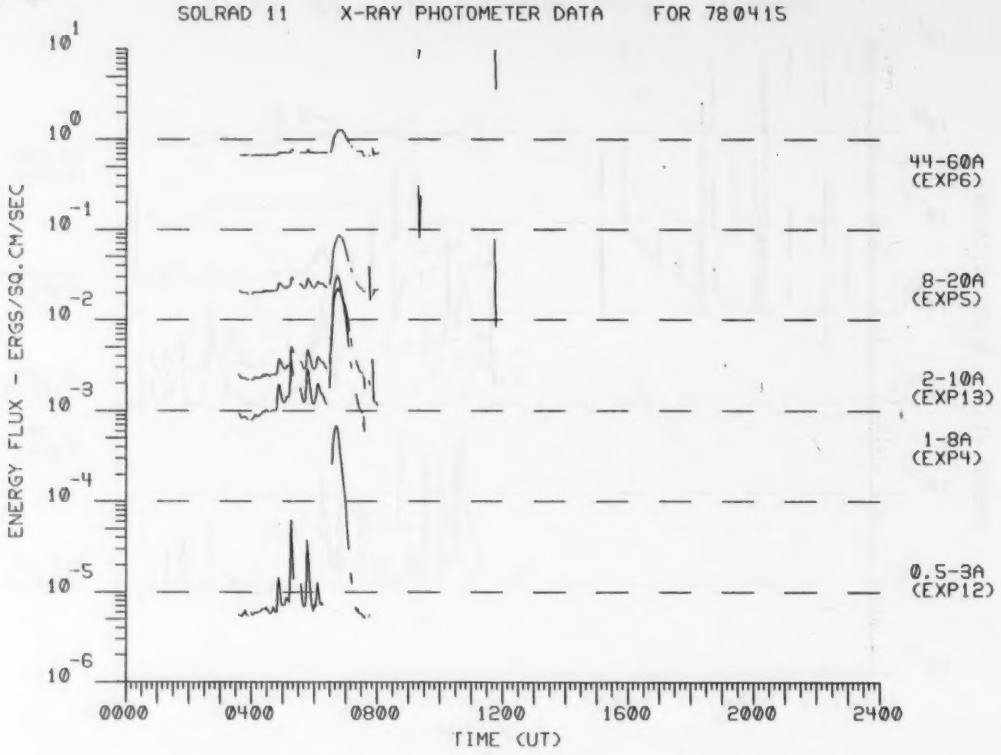
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780415
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{0}
10^{-1}
10^{-2}
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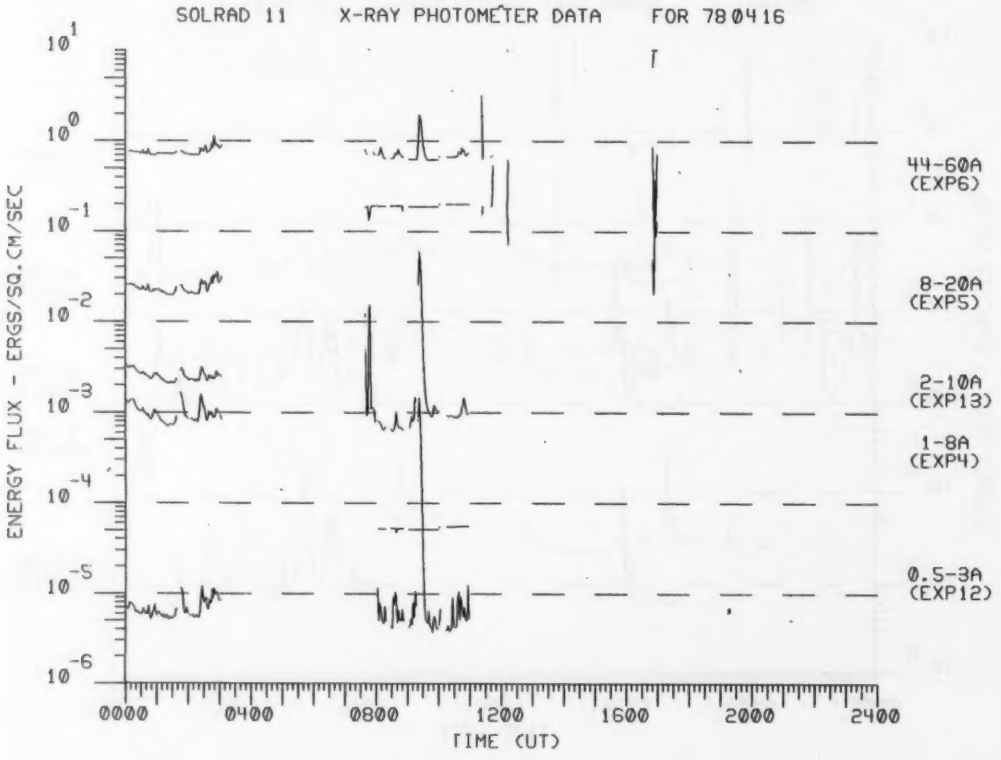
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780416
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-1}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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1600
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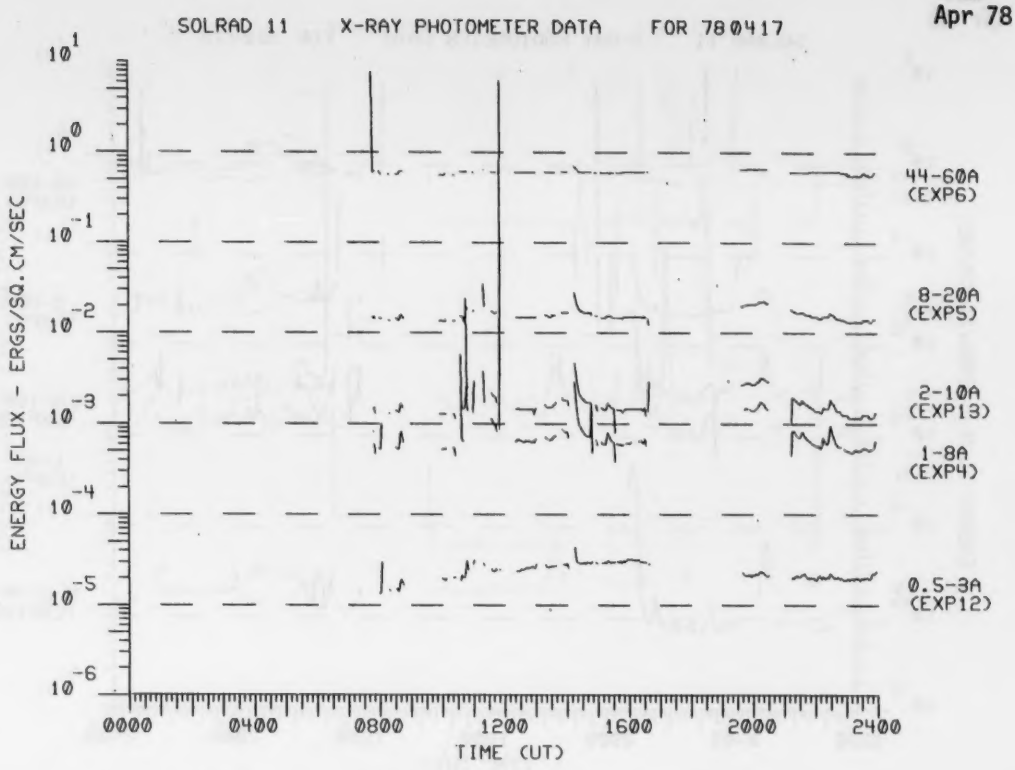
2400
TIME (UT)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ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-4}
10^{-5}
10^{-6}
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8-20A (EXP5)
2-10A (EXP13)
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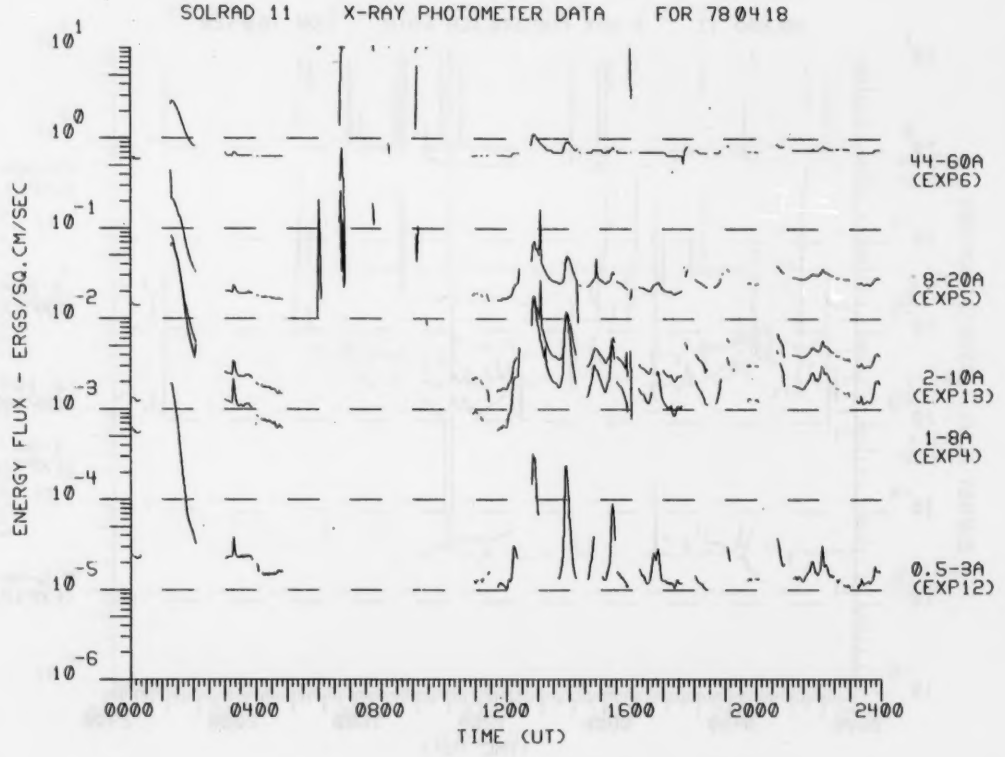
2400
TIME (UT)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ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
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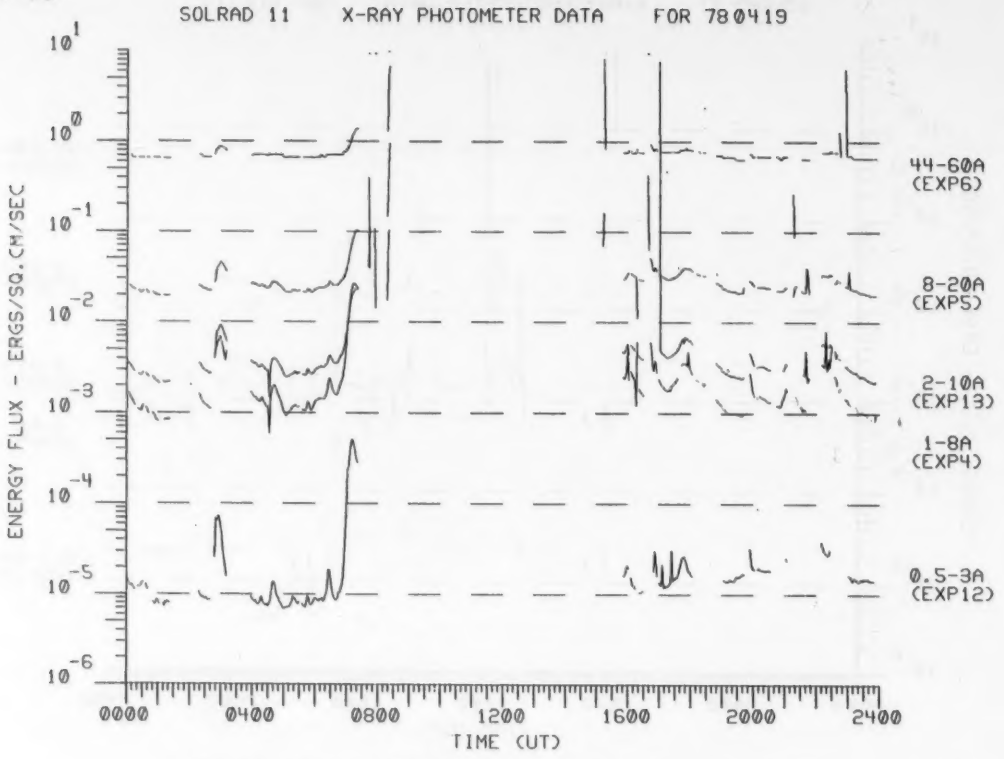
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780419
ENERGY FLUX - ERGS/SQ.CM/SEC
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10^{-2}
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10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
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2000
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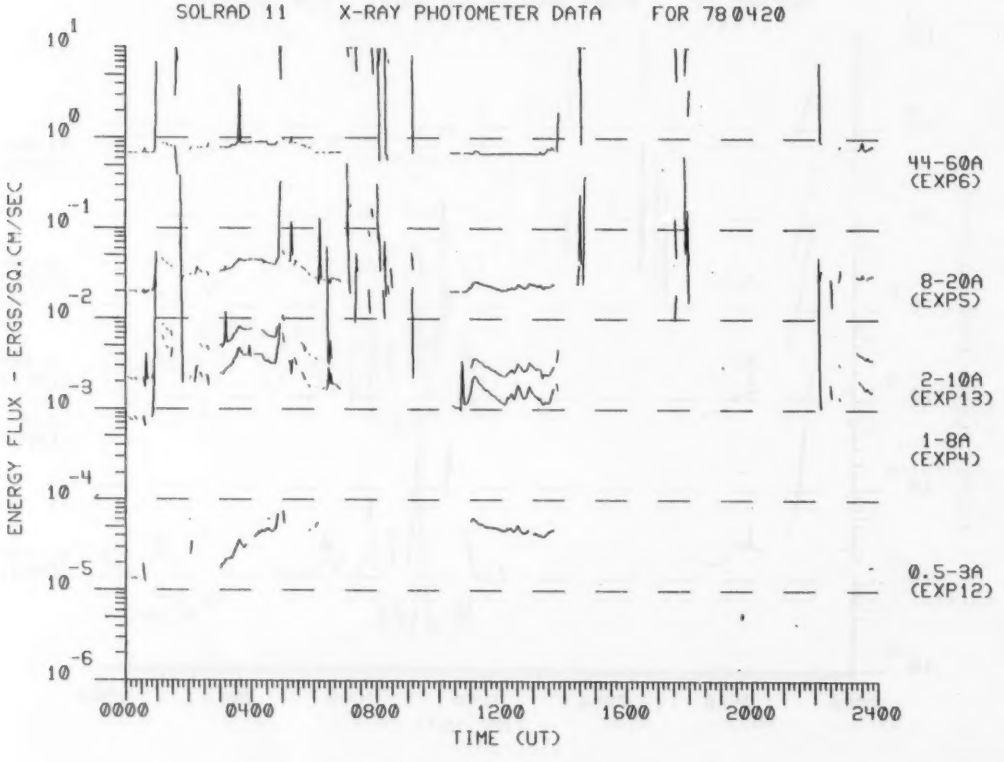
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780420
ENERGY FLUX - ERGS/SQ.CM/SEC
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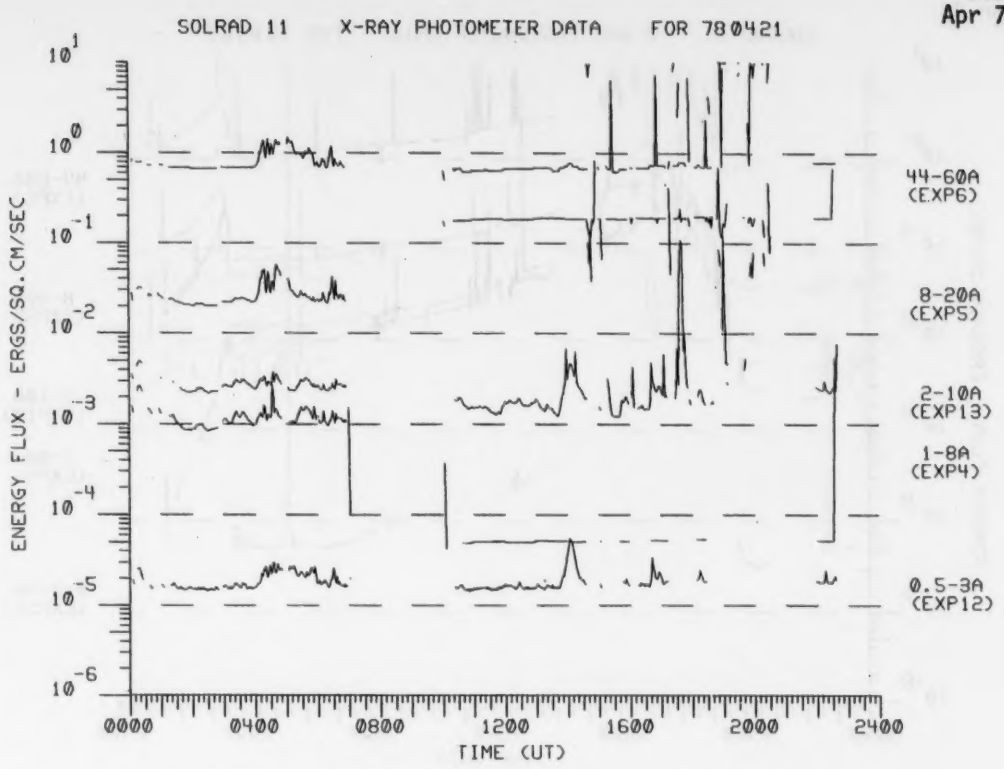
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780421
ENERGY FLUX - ERGS/SQ.CM/SEC
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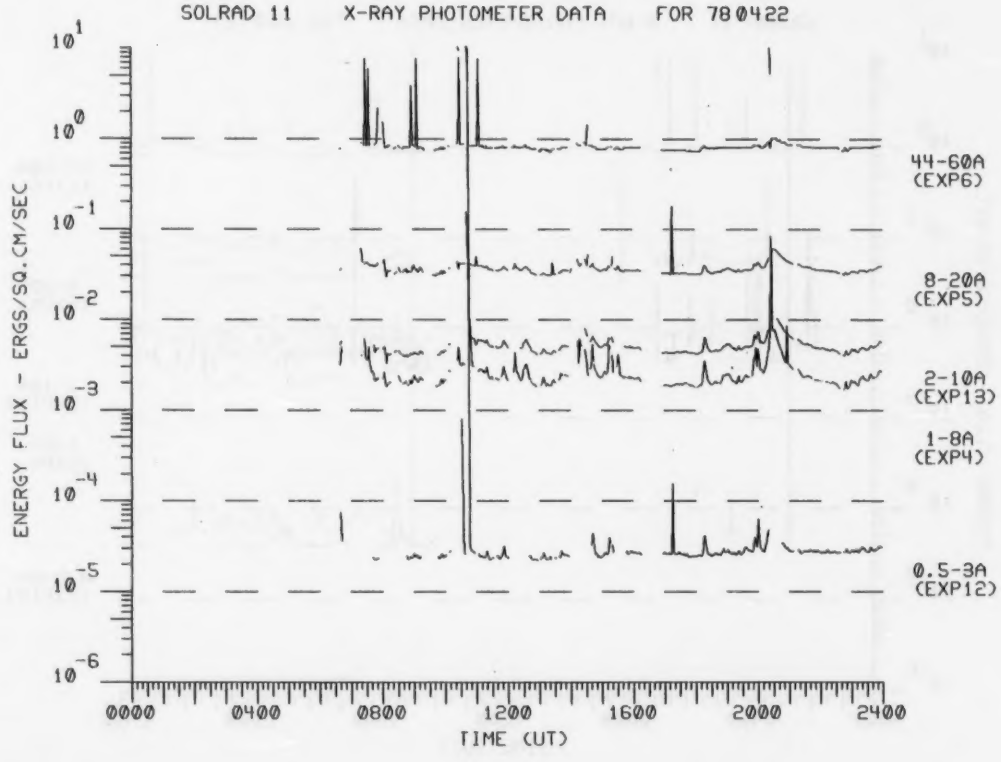
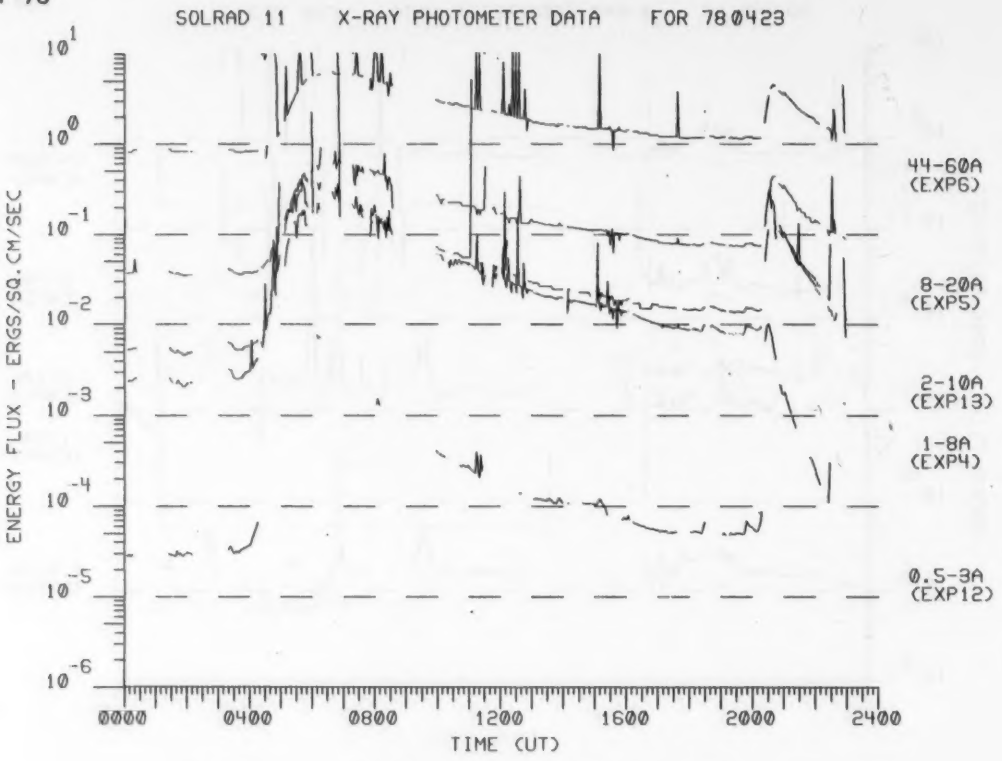
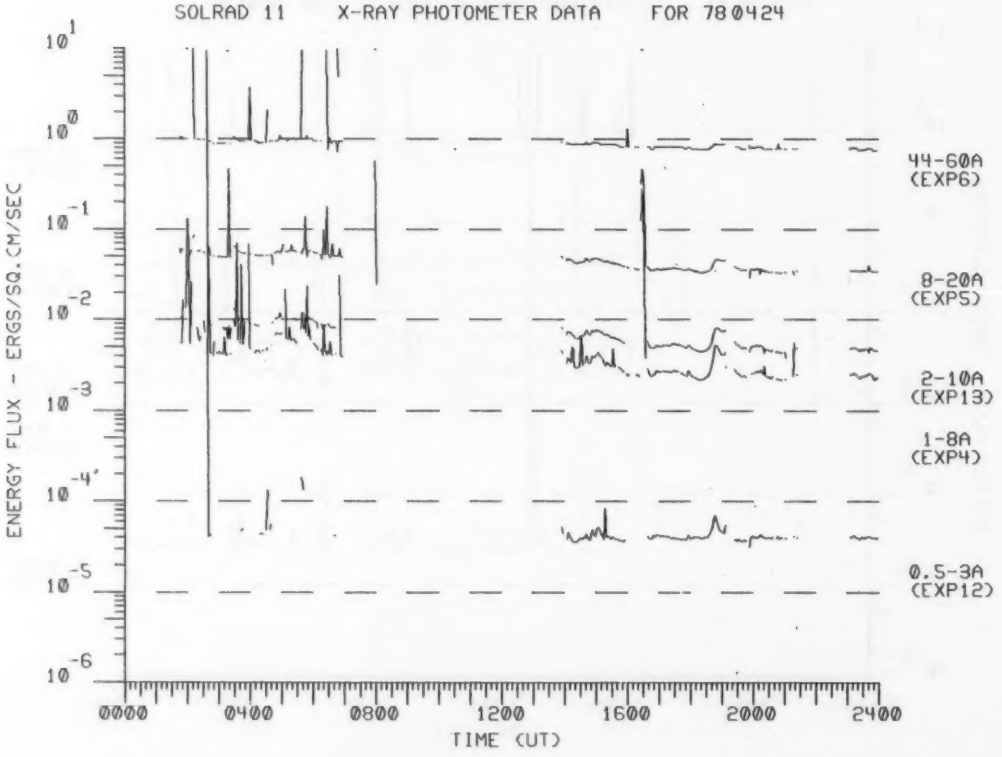
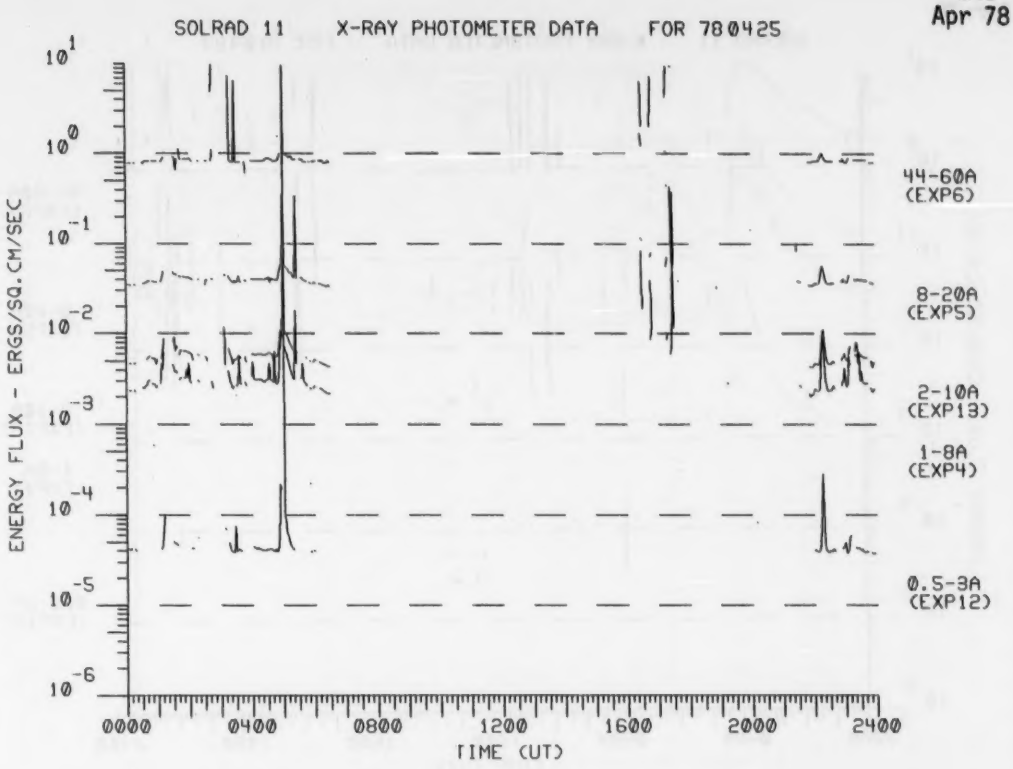
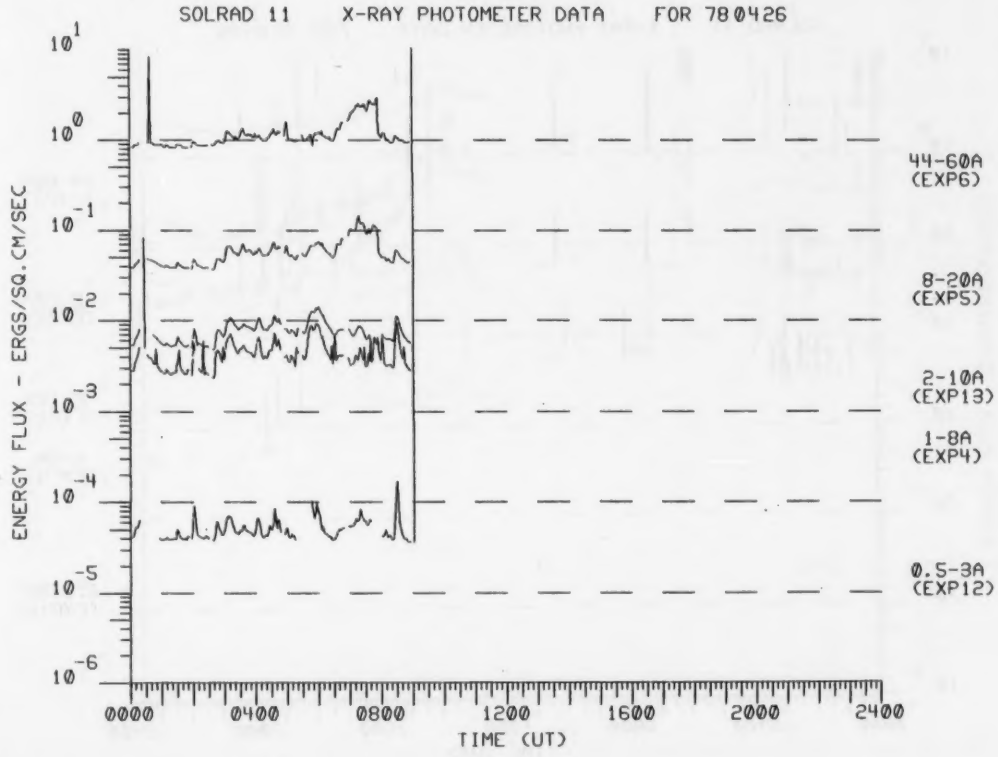
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

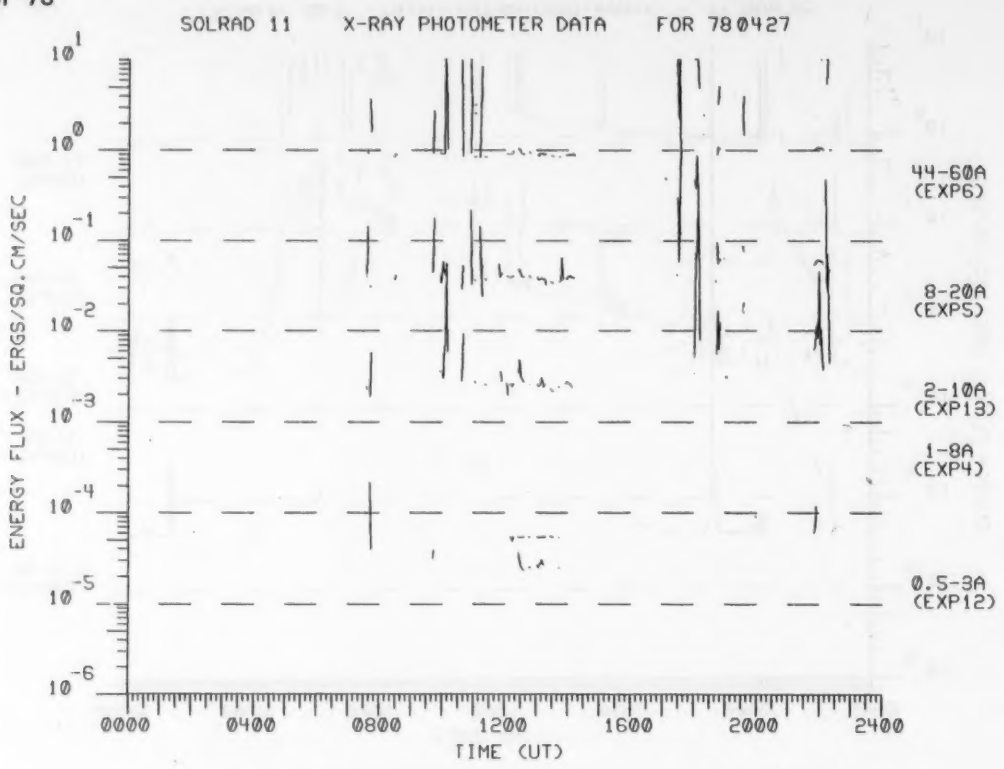

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780422
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

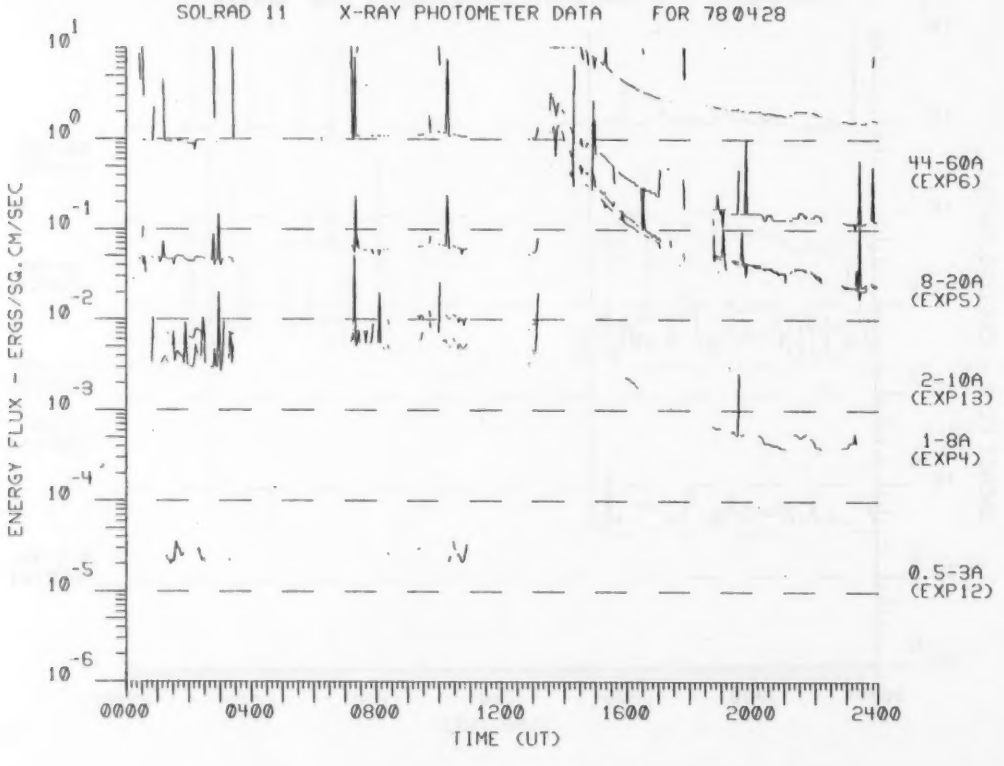

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780423
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

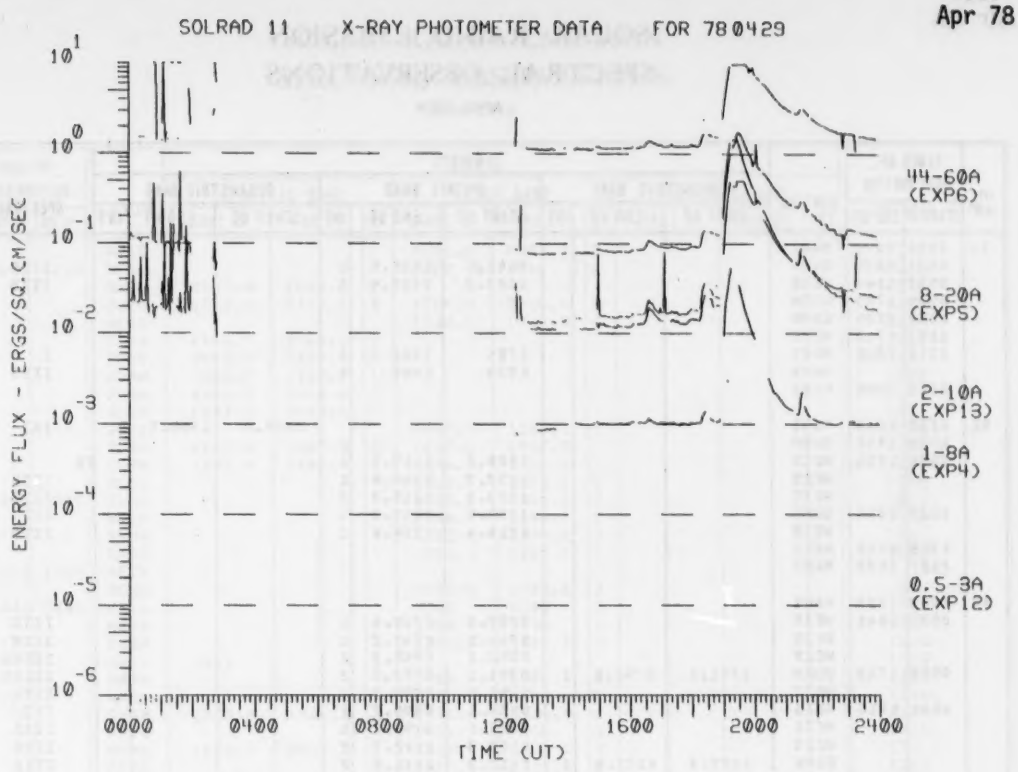

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780424
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

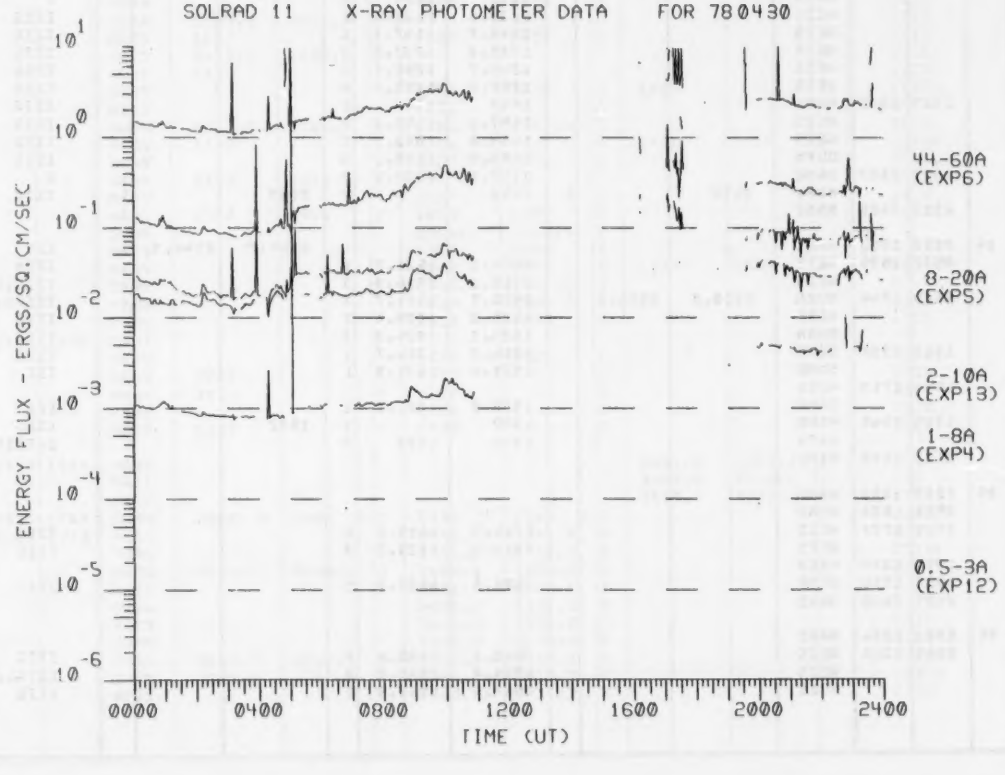

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780425
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780426
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780427
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780428
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780429
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780430
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0000	1006	MANI										
	0531	0859	DURN				0601.5	0601.5	1				IIIB
	0537	1143	WEIS				0808.2	0808.4	1				IIIB
	0934	1709	DURN										
	1030	2305	SGMR										
	1153	1715	WEIS										
	1315	2345	HARV				1701	1703	1				I
			HARV				1939	1940	1				IIIG
	2158	2400	MANI										
02	0000	1010	MANI							0305.0	0305.5	1	III
	0529	1741	DURN										
	0636	1716	WEIS				1108.2	1115.5	1				II
			WEIS				1137.2	1140.5	1				IIIG
			WEIS				1209.1	1210.3	2				IIIG
	1028	2306	SGMR				1209.6	1210.0	1				III
			WEIS				1214.4	1214.6	1				IIIB
	1315	2345	HARV										
	2127	2400	MANI										
03	0000	1003	MANI										
	0532	0841	WEIS				0702.0	0702.6	1				IIIG
			WEIS				0744.1	0744.2	1				IIIB
			WEIS				0750.0	0752.3	2				IIIGG
	0529	1743	DURN	0751.1	0752.0	1	0751.1	0752.0	2				IIIGG
			WEIS				0755.2	0755.3	1				IIIB
	0846	1718	WEIS				0955.5	0956.7	2				IIIG
			WEIS				0958.1	0958.2	1				IIIB
			WEIS				1122.3	1122.7	2				IIIG
			DURN	1122.3	1122.6	1	1122.3	1111.6	2				IIIG
			DURN				1132	1254	1				I
			WEIS				1133.0	1133.4	1				IIIG
			WEIS				1146.7	1147.1	1				IIIG
			WEIS				1231.0	1232.8	1				IIIG
			WEIS				1248.7	1251.1	1				IIIG
			WEIS				1252.8	1253.5	2				IIIG
	1315	2345	HARV				1447	1500	1				IIIG
			WEIS				1457.2	1458.0	2				IIIG
			WEIS				1459.8	1500.7	2				IIIG
			DURN				1459.9	1500.2	3				IIIG
	1027	2307	SGMR				2052.1	2052.5	2				V
			HARV	2052		1	2052		2	2052		1	IIIG
	2113	2400	MANI										
04	0000	1003	MANI							0144.7	0144.9	1	III
	0532	1639	WEIS				0624.0	1631.2	1				IIIN
			WEIS				0910.2	0914.8	3				IIIG,U
	0529	1744	DURN	0910.8	0914.8	2	0910.8	0911.7	3				IIIGG,RS
			WEIS				1025.0	1025.4	2				IIIG
			DURN				1025.1	1025.3	3				IIIG
	1025	2308	SGMR				1314.2	1314.7	1				IIIG
			SGMR				1630.8	1631.0	1				III
	1654	1719	WEIS										
			SGMR				1902.0	1902.2	1				III
	1315	2345	HARV				1902		1	1902		1	IIIG
			HARV				1944	2028	2				I,IIIN
	2122	2400	MANI										
05	0000	1000	MANI										
	0528	1636	DURN										
	0529	1721	WEIS				0744.7	1619.0	1				IIIN
			WEIS				0819.6	0820.2	3				IIIG
	1300	2345	HARV										
	1023	2310	SGMR				1421.8	1422.0	1				III
	2127	2400	MANI										
06	0000	1004	MANI										
	0540	1308	WEIS				0540.2	0642.4	2				IIIG
			WEIS				0544.8	0545.2	2				IIIG,U
			WEIS				0547.5	0547.9	2				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS										SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND				
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT		
06			WEIS				0551.8	0552.2	2					IIIG
	0627	1748	DURN				0627 E	1748 D	1					IS,DC
			DURN	0647.8	0648.2	1								IIIG
			DURN	0713.9	0715.2	3	0714.3	0714.4	3					IIIGG
			WEIS				0732.8	1717.0	3					IIIN
			DURN	0748.2	0748.3	2								IIIG
			DURN	0858.3	0858.9	2								IIIG
			DURN	0908.7	0908.7	1								IIIB
			DURN	0953.6	0953.6	3								III
			DURN	1022.6	1022.6	2								III
			WEIS				1047.5	1048.1	2					IIIG
			DURN	1047.6	1047.9	2	1047.6	1047.9						IIIG
			DURN	1104.4	1106.4	3	1104.4	1106.4	2					IIIGG
			WEIS				1114.5	1114.7	2					IIIG
	1022	2311	SGMR				1128.5	1149.6	2					IIIG
			WEIS				1144.5	1146.4	2					IIIG
			SGMR				1223.0	1224.4	2					IIIG
			DURN				1223.4	1223.5	1					IIIG
	1316	1722	WEIS											
			SGMR				1332.6	1428.6	2					IIIS
	1300	2345	HARV				1332	1338	2					IIIG
			HARV				1349	1354	1					IIIN
			DURN				1354.5	1354.7	3					IIIG
			HARV	1412		1								IIIG
			HARV				1419	1420	1					IIIG
			HARV				1426	1431	2					IIIGG
			DURN	1433.8	1434.0	1	1433.8	1434.0	2					IIIG
			HARV				1454	1456	1					IIIG
			DURN	1520.1	1520.2	2	1520.1	1520.2	2					III
			SGMR				1614.9	2311.0	2					IIIS
			HARV				1614	1619	2					IIIG
			DURN	1633.2	1633.3	2								IIIG
			HARV	1633		1	1633	1635	2					IIIG
			DURN	1639.0	1639.3	2								IIIG
			HARV	1639		1								IIIG
			HARV				1652	1656	3	1653		3		IIIGG
			HARV				1703		1					IIIG
			DURN	1713.6	1715.4	2	1713.6	1715.4	2					IIIG
			HARV	1714		1	1714	1717	2	1714	1717	1		IIIGG
			HARV				1727	1728	1					IIIG,W
			HARV	1802	1812	1								IIIN,W
			HARV				1827		1					IIIB
			HARV	1858	1910	2	1859	1903	2					IIIGG
			SGMR				1904.6	1908.9	2				II	
			HARV				1904	1913	3				II	
			HARV				1940	1947	3	1945	1946	3		IIIGG
			SGMR				1945.4	1947.0	3					V
			HARV				2003	2004	1					IIIG
			HARV				2018	2025	2					IIIG
	2116	2400	MANI											
			HARV				2120	2121	1					IIIG
			HARV	2200		1	2200		1					IIIG
			HARV	2210		3	2210		3					IIIG
			HARV				2221		1					IIIB
			HARV	2237		1	2236		2					IIIG
07	0000	1000	MANI							0001.9	0002.2	1		III
			MANI							0323.5	0323.9	1		III
			MANI							0419.7	0420.3	1		III
	0530	1748	DURN	0530 E	1748 D	1	0530 E	1748 D	1					I,DC
	0625	1723	WEIS				0541.5	1704.5	3					IIIN
			DURN				0541.9	0542.4	3					IIIGG
			DURN	0604.1	0604.1	3	0604.1	0604.1	3					III
			WEIS				0621.1	0622.4	3					IIIG
			DURN				0621.2	0621.8	3					IIIGG
			WEIS				0638.9	0639.8	3					IIIG
			DURN				0639.0	0639.6	3					IIIGG
			DURN	0646.7	0648.1	1	0647.7	0648.1	2					IIIGG
			DURN	0705.4	0710.5	1	0705.2	0719.7	3					IIIGG
			WEIS				0709.7	0711.2	3					IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
07			DURN	0817.6	0818.0	3	0817.6	0818.1	3				IIIGG
			DURN	0826.3	0827.7	3							IIIGG
			DURN	0830.0	0830.2	1							IIIG
			DURN				0832.5	0833.1	1				IIIGG
			DURN	0858.7	0902.1	2	0858.7	0902.1	3				IIIGG
			DURN				0918.5	0918.5	2				III
			WEIS				0948.0	1706.3	2				IN
	1020	2312	SGMR				1118.8	2312.0	1				CONT
			DURN	1140.4	1142.8	3							IIIGG
			DURN	1217.7	1217.8	1	1217.7	1217.8	1				IIIG
			DURN	1249.7	1249.8	2	1249.7	1249.8	2				IIIG
	1301	2345	HARV	1309		1	1309	1310	2				IIIG
			DURN	1334.6	1335.0	3	1334.6	1334.9	3				IIIGG
			HARV	1335	1341	2	1335	1341	2				IIIGG
			DURN	1340.3	1340.9	3	1340.3	1340.9	3				IIIGG
			HARV				1417		2				IIIG
			DURN	1434.4	1458.5	3	1434.4	1458.5	3				IIIGG,N
			WEIS				1434.5	1438.0	3				IIIG
			SGMR				1435.8	1437.0	3				III
			HARV	1435	1458	3	1430	1458	3				IIIGG,V
			WEIS				1443.8	1445.1	3				IIIG
			WEIS				1452.2	1454.4	3				IIIG
			WEIS				1456.0	1458.5	3				IIIG
			HARV				1518	1539	1				IIIN
			DURN				1538.5	1538.5	3				III
			DURN	1547.4	1556.9	3	1547.1	1556.9	3				IIIG,N
			HARV	1547	1554	3	1547	1558	3				IIIGG
			WEIS				1550.0	1555.3	3				IIIG
			HARV	1637		1	1637	1643	1	1643		1	IIIG
			DURN				1659.5	1700.8	3				IIIGG
			HARV				1659	1705	2				IIIGG
			HARV				1712	1804	2				I
			DURN	1733.5	1733.5	1	1733.5	1733.5	1				III
			HARV	1733		1	1733		2				IIIB
			HARV				1745	1747	3	1745	1747	3	IIIGG
			HARV				1814	1815	1	1814	1815	1	IIIG
			HARV	1841	1842	3							IIIG
			HARV				1919	2200	2				I
			HARV				1924	1926	1				IIIG
			HARV	1930	1932	3							IIIGG
			HARV				1940		2				IIIB
			SGMR				2015.7	2023.0	3				III
			HARV	2015	2020	3	2015	2020	3	2015	2018	3	IIIGG,V
			HARV				2023	2027	1				II
			HARV				2028	2029	3				IIIG
			HARV				2056		1				IIIG
			HARV				2111	2124	2				IIIGG
			HARV	2130	2135	2	2130	2135	2				IIIGG
	2132	2400	MANI										
			HARV				2204		3				IIIG
			HARV				2206	2236	1				IN
			HARV	2225		3	2223	2225	3				IIIGG
			HARV				2335		1				IIIG,W
			HARV				2342	2343	1				IIIG,W
08	0000	1004	MANI							0219.1	0541.0	1	CONT
	0523	0845	WEIS				0525.0	0738.0	2				I
	0901	1725	WEIS				0526.0	1707.0	2				IN,DC
			DURN	0529 E	0806	3							IV, F
	0529	1749	DURN				0529 E	1749 D	1				I,DC
			WEIS				0553.0	1648.0	3				IIIN
			WEIS				0803.5	0819.5	3				IIIGG,V
			MANI							0804.3	0808.2	1	IV
			DURN	0804.5	0809.6	3	0804.2	0811.3	3				IIIGG
			DURN	1052.4	1053.6	3	1052.4	1053.6	3				IIIGG
	1018	2313	SGMR				1111.5	2313.0	2				CONT
			WEIS				1118.8	1130.5	3				IIIGG,V
			SGMR				1119.0	1130.6	3				IV
			DURN	1121.5	1125.8	3	1121.2	1125.0	3				IIIGG
			DURN	1140	1720								IV, F

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
08			DURN				1202.5	1202.7	1				IIIG
			DURN				1204.6	1204.6	1				III
			DURN	1229.3	1229.5	1	1229.3	1229.5	2				IIIG
			DURN	1249.4	1250.5	1	1249.4	1250.5	2				IIIG
	1300	2345	HARV				1314	1318	1				IIIN
			HARV				1337	1339	1				IIIG
			HARV				1349	1400	2				IIIGG
			DURN	1400.1	1400.2	1	1400.1	1400.2	2				IIIG
			HARV				1441	2305	1				IIIN,I
			DURN				1457.8	1458.8	2				IIIG
			HARV				1459	1500	3				IIIG
			DURN	1623.4	1623.9	3	1623.4	1623.9	3				IIIGG
			WEIS				1623.4	1624.2	3				IIIG
			DURN	1624.9	1625.1	1	1624.9	1625.1	1				IIIG
			HARV	1624		2	1623	1624	3	1624		3	IIIG,V
			HARV				1649	1650	3	1650		3	IIIGG
			HARV	1826		2	1824	1826	2				IIIG
			HARV				1836		3	1836		3	IIIG
			HARV	1906		2	1905	1907	3				IIIGG
			HARV				1931	1932	2	1931		2	IIIG
			HARV				2037	2039	2				IIIG
			HARV				2044		3	2044		3	IIIG
			HARV	2052	2053	1	2052	2053	3	2053		3	IIIGG
			HARV				2123	2124	3	2124		3	IIIG
			HARV				2130	2133	2	2130	2132	1	IIIG
	2132	2400	MANI										
			HARV	2215		1	2215		2				IIIG
			HARV	2312		2	2310	2315	3				IIIGG
			HARV				2319	2320	2				IIIG
			HARV	2322	2323	1							IIIG
			HARV				2328		1				IIIB
09	0000	1008	MANI							0004.1	0004.4	1	III
			MANI							0106.1	0107.0	1	III
			MANI							0315.0	0327.8	1	IIIG
			MANI							0446.6	0447.5	1	III
			WEIS				0526	1232.0	1				IN
	0530	1751	DURN				0530 E	1445	1				I,DC
	0521	1711	WEIS				0544.0	1701.0	2				IIIN
			WEIS				0651.3	0652.5	2				IIIG
			DURN	0652.2	0652.2	3	0652.2	0652.2	3				III
			DURN	0655.3	0655.5	3	0655.3	0655.3	3				IIIG
			WEIS				0655.3	0655.5	3				IIIG
			WEIS				0703.5	0705.0	3				IIIG
			DURN	0703.7	0715.2	3	0703.7	0715.2	3				IIIGG,N
			WEIS				0709.6	0710.8	2				IIIG,RS
			WEIS				0714.5	0715.0	3				IIIG
			WEIS				0714.9	0717.4	3				IIIGG
			DURN	0731.3	0731.3	1	0731.3	0731.3	1				III
			WEIS				0735.4	0736.4	2				IIIG
			WEIS				0759.8	0802.4	3				IIIG
			DURN	0759.9	0802.5	1	0759.9	0802.5	3				IIIGG
			WEIS				0811.9	0812.4	3				IIIG
			DURN	0812.0	0813.9	1	0809.2	0813.9	3				IIIGG
			DURN				0945.8	0946.1	2				IIIG
			WEIS				1016.6	1016.9	2				IIIG
			DURN				1016.7	1016.9	2				IIIG
			WEIS				1039.5	1040.6	2				IIIG
			DURN				1039.6	1040.7	2				IIIG
			DURN	1134.5	1136.1	1	1134.5	1136.1	3				IIIG
			WEIS				1134.6	1135.6	3				IIIG
			DURN				1139.8	1139.8	2				IIIG
			DURN				1141.7	1141.7	3				III
	1016	2314	SGMR				1200.1	1206.4	3				IV
			WEIS				1200.2	1206.8	3				IIIGG,V
			DURN	1200.7	1205.2	3	1200.6	1205.9	3				IIIGG
			SGMR				1206.4	2314.0	2				CONT
			DURN	1219.4	1219.7	2	1219.4	1219.7	3				IIIG
			WEIS				1219.4	1220.7	2				IIIG
			DURN	1308.2	1309.0	3	1308.2	1309.0	3				IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
09			WEIS				1308.3	1309.7	2				IIIG
	1301	2345	HARV				1308	1309	2				IIIG
			WEIS				1331.1	1333.5	3				IIIGG
			HARV				1331	1333	3	1333		3	IIIG
			WEIS				1352.5	1353.6	3				IIIG
			HARV				1353		2				IIIG
			DURN				1400.1	1400.2	2				IIIG
			HARV				1427	1437	2				IIIN
			WEIS				1444.5	1445.0	2				IIIG
			DURN				1444.6	1444.6	2				III
			HARV				1445	1450	3				IIIG
			HARV				1640	1650	1				IIIN
			HARV				1701	1703	2				IIIG
			HARV				1732	1734	3	1733		3	IIIG
			HARV				1743		1				IIIB
			HARV				1750	1758	3	1750	1756	3	IIIGG
			SGMR				1752.8	1754.3	3				V
			HARV				1831	1834	1				IIIG
			HARV				1847		1				IIIB
			SGMR				1912.3	1921.4	3				V
			HARV	1917	1921	1	1917	1929	3	1917	1927	3	IIIGG
			HARV				1954	1958	3	1954	1958	2	IIIGG
			HARV	2045	2053	2	2045	2059	3	2053		2	IIIG
			HARV				2110		1				IIIB
			HARV				2140	2141	1				IIIG
	2122	2400	MANI							2151.7-	2152.2	1	III
			HARV				2157		2				IIIB
			HARV				2213	2215	1				IIIG
			HARV				2239		2				IIIG
			HARV	2250	2256	1	2249	2257	3	2252	2257	1	IIIGG
10	0000	1004	MANI							0219.5	0222.0	1	IIIG
			MANI							0248.6	0249.2	1	III
			MANI							0313.5	0316.7	2	IIIG
			MANI							0447.3	0448.3	1	III
			MANI							0551.9	0552.3	1	III
	0529	1321	DURN	0618.0	0619.0	2	0610.0	0619.3	3				IIIG,N
			DURN				0706	1321 D	1				IS
	0748	1728	WEIS				0801.5	1606.5	1				IIIN
			DURN	0822.5	0826.2	3	0822.5	0826.2	3				IIIG
			WEIS				0828.3	0831.8	2				IIIG
			DURN	1047.0	1047.2	2	1047.0	1047.2	1				IIIG
			DURN	1054.0	1058.5	3	1054.0	1059.5	3				IIIGG
			WEIS				1054.2	1100.7	3				IIIG
			WEIS				1055.3	1124.0	3				IIH B
			DURN	1055.3	1058.5	3	1055.3	1059.5	3				II
	1015	2315	SGMR				1103.2	1104.3	2				V
			WEIS				1143.0	1208.0	2				CONT
			DURN				1218.1	1218.4	3				IIIG
			WEIS				1218.2	1218.6	3				IIIG
			DURN	1225.5	1225.6	2	1225.5	1225.6	2				IIIG
			WEIS				1233.7	1235.3	2				IIIG
	1301	2352	HARV				1334	1335	1				IIIG
			HARV				1455		2				IIIB
			SGMR				1457.0	2315.0	1				CONT
			HARV				1510	1515	3	1510		2	IIIG
			HARV				1531		1				IIIB
			HARV				1549	1552	2				IIIG
			WEIS				1608.3	1609.3	2				IIIG
			HARV	1608		1	1608	1610	2	1610		2	IIIG
			WEIS				1610.3	1611.2	3				IIIG
			WEIS				1616.0	1617.5	3				IIIG
			WEIS				1628.4	1629.7	3				IIIG
			HARV				1629	1630	3	1629	1630	3	IIIG
			SGMR				1717.1	1718.0	3				V
			HARV				1717	1718	3	1717	1718	3	IIIG
			WEIS				1727.1	1727.7	3				IIIG
			HARV				1750		3	1750		3	IIIG
			HARV				1817		2				IIIB
			SGMR				1827.3	1827.9	3				V

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
10			HARV	1827		2	1827		3	1827		3	IIIG
			SGMR				1850.7	1851.0	3				V
			HARV				1850	1851	3	1850	1851	3	IIIG
			HARV				1906		2	1906		2	IIIB
			HARV				1913	1924	3	1913	1924	3	IIIG
			HARV				1936	1939	3	1936	1939	3	IIIG
			HARV	1957		1	1954	1957	3	1954	1957	3	IIIGG,V
			HARV				2030	2031	2				IIIG
			SGMR				2101.4	2101.9	3				V
			HARV	2101		3	2101	2104	3				IIIG
			HARV				2202		2				IIIB
			HARV				2228		2				IIIG
			HARV				2325	2329	3				IIIG
			HARV	2348	2351	1	2350	2352	1				IIIG
	2129	2400	MANI							2351.7	2351.9	1	III
11	0000	1000	MANI							0300.7	0300.9	2	III
	0517	1559	WEIS				0520.0	1656.5	2				IIIN
	0543	1755	DURN				0543 E	1755 D	1				I
			WEIS				0604.8	0607.5	3				IIIG,V
			MANI							0605.0-	0606.3	1	III
			DURN	0605.4	0605.8	3	0604.9	0605.8	3				IIIGG
			DURN	0635.4	0635.5	2							IIIG
			DURN	1023.2	1023.2	1							III,RS
			DURN				1042.1	1042.3	1				IIIG
	1013	2316	SGMR				1229.6	2208.5	2				CONT
			WEIS				1331.7	1432.8	2				IIIG
			WEIS				1334.1	1335.7	3				IIIG
	1300	2345	HARV				1341	1342	1				I
			HARV				1344	1346	2				IIIG
			WEIS				1349.0	1521.0	3				IV, P
			DURN	1349.0	1402.0	3	1351.0	1402.0	3				II
			DURN	1349.0	1620.0	3	1349.0	1620.0	3				IIIG,N,RS
			HARV	1350	1417	3	1351	1417	3				IV
			HARV	1350	1407	3							IIIN
			DURN	1355.0	1620.0	3	1400.0	1620.0	3				IV
			WEIS				1358.7		3				II
			SGMR				1358.8	1432.0	3				II
			HARV				1359	1425	3				II
			HARV				1401	1438	1				IN
			WEIS				1404.3	1433.0	3				IV, P
			HARV				1406	1413	3	1406	1413	3	IIIGG,RS
			WEIS				1436.4	1450.4	3				IIIGG,V
			HARV	1436	1441	1	1436	1452	3	1436	1449	2	IIIGG
			SGMR				1437.9	1443.9	2				IV
			SGMR				1447.0	1448.8	2				IIIG
			WEIS				1533.2	1536.7	3				IIIG,RS
			HARV	1537		1	1533	1536	2	1533		1	IIIG
			HARV				1549		2				IIIB
			HARV				1555		1				IIIG
			HARV	1622	1623	1							IIIG
			HARV				1626		1				IIIB
			HARV				1632		1				IIIB
	1614	1729	WEIS				1633.8	1639.7	3				IIIG,VU
			SGMR				1633.9	1639.2	3				V
			DURN				1634.4	1634.6	3				IIIG
			HARV				1634	1640	3	1634	1639	3	IIIGG
			DURN	1637.1	1637.1	3							III
			HARV				1642	1648	1				IIIN
			DURN	1655.5	1656.0		1654.8	1656.0	2				IIIGG
			HARV	1656		1	1655	1656	1				IIIG
			HARV				1708	1709	1				IIIG
			HARV				1748	1750	3	1748	1750	3	IIIGG
			HARV				1756		1				IIIB
			HARV				1801	1802	1				IIIG
			HARV				1811	1812	2				IIIG
			HARV				1820	1821	2				IIIGG
			HARV				1835	1836	2				IIIG
			HARV	1854		1	1851	1858	2	1851	1858	2	IIIGG
			HARV				1903		1				IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
11			SGMR				1911.4	1912.5	2				IIIG
			HARV	1912		3	1911	1913	3	1911	1913	3	IIIGG
			HARV				1924	1941	2	1924	1941	2	IIIN
			HARV				1953	2005	3	1953	2005	3	IIIN
			HARV	2015		2							IIIG
			HARV				2018	2021	3	2018	2021	3	IIIG
			SGMR				2024.7	2026.3	3				V
			HARV				2025	2026	3	2025	2026	3	IIIG,V
			SGMR				2028.9	2102.1	3				IIIG
			HARV				2028	2030	3	2028	2030	3	IIIG,V
			HARV	2035		1	2032	2037	3	2032	2037	3	IIIGG
			HARV	2046	2121	2	2042	2121	2	2042	2121	2	IIIN
	2110	2400	MANI										
			HARV				2150		1				IIIG
			SGMR				2154.2	2154.8	3				V
			HARV	2154		3	2154		3	2154		3	IIIG,V
			HARV				2208	2314	2	2208	2217	2	IIIN
			HARV	2344		2	2344	2345	2				IIIG
12	0000	1004	MANI							0023.8	0024.0	1	III
			MANI							0202.7	0203.0	1	III
			MANI							0206.5	0206.8	1	III
			MANI							0222.8	0223.1	1	III
			MANI							0236.3	0236.5	1	III
			MANI							0303.2	0303.4	1	III
			MANI							0309.8	0310.0	1	III
			MANI							0327.8	0328.4	1	III
			MANI							0426.5	0426.8	1	III
			MANI							0435.7	0435.9	1	III
			MANI							0507.4	0507.6	1	III
	0616	1729	WEIS				0529.5	1721.0	2				IIIN
			WEIS				0544.8	0545.9	3				IIIG
	0530	1756	OURN				0546.0	0546.4	3				IIIG
			WEIS				0632.5	0632.7	3				IIIB
			WEIS				0636.2	0637.4	3				IIIG,U
			OURN				0637.3	0638.6	2				IIIG
			WEIS				0712.5	0712.6	3				IIIB
			OURN	0740.3	0742.9	3	0740.3	0741.5	3				IIIG
			WEIS				0740.4	0742.6	3				IIIG
			OURN	0740.5	0741.2	3	0740.5	0741.2	3				V
			WEIS				0757.0	0759.4	3				IIIG
			OURN	0758.7	0800.4	3	0758.7	0800.4	3				IIIGG
			WEIS				0907.5	0911.0	3				IIIG
			OURN	0908.7	0914.5	1	0908.7	0912.1	2				IIIGG,RS
	1011	2317	SGMR				1309.4	1323.0	1				IIIS
	1301	2345	HARV				1310	1323	1				IIIN
			SGMR				1501.4	1501.8	1				III
			HARV				1501		1				IIIG
			SGMR				1526.8	2317.0	2				IIIS
			HARV				1526	1549	2				IIIN
			WEIS				1547.9	1548.2	2				IIIG,U
			HARV				1618	1705	2				IIIN
			OURN	1719.5	1721.4	1	1719.5	1721.4	3				IIIGG
			HARV				1719	1721	2				IIIGG
			OURN				1721	1756 D	1				I,OC
			OURN	1735.6	1737.9	3	1736.1	1737.9	3				IIIG
			HARV	1736	1739	2	1737	1741	1				IIIG
			HARV				1741	1743	2				II
			HARV				1744	1834	2				IIIN
			OURN	1754.2	1754.3	1	1754.2	1754.3	1				IIIG
			HARV				1850	1952	2				IIIN
			HARV				1956		3				IIIG,V
			HARV				2009	2012	3				IIIG
			HARV				2017	2023	3				IIIGG
			HARV				2024	2041	1				IIIN
			SGMR				2026.9	2027.2	3				III
			HARV				2027		3				IIIB,V
			SGMR				2036.1	2036.5	3				III
			HARV				2036		3				IIIB,V
			HARV				2111	2344	2				IIIN

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
12	2131	2400	MANI							2242.9	2243.8	1	IIIG
			HARV				2242	2244	3				IIIGG
			MANI							2324.0	2327.4	1	IIIG
			HARV				2324	2327	3				IIIGG
			MANI							2354.0	2354.2	1	III
13	0000	0958	MANI							0002.0	0003.0	1	IIIG
			MANI							0033.2	0038.4	1	IIIG
			MANI							0122.2	0123.0	1	III
			MANI							0236.0	0236.4	1	III
			MANI							0241.8	0247.3	1	IIIG
			MANI							0404.2	0408.9	1	IIIG
			MANI							0441.1	0441.3	1	III
			MANI							0447.2	0449.0	1	IIIG
			MANI							0626.2	0627.0	1	III
			MANI							0705.8	0708.5	1	III
	0714	1421	WEIS				0800.5	1627.0	2				IIIN
			WEIS				0824.0	0825.3	3				IIIGG
			MANI							0824.8	0825.0	1	III
			WEIS				0911.0	0915.0	3				IIIGG,V
	0530	1756	OURN				0913.3	0914.0	2				IIIG
			MANI							0913.6	0913.8	1	III
			WEIS				0929.6	0933.8	2				IIIG,V
			WEIS				0943.8	0950.1	3				IIIG,V,RS
			OURN				0944.1	0944.7	3				IIIG,RS
			OURN	1005.4	1005.4	3	1005.4	1005.4	3				IIIG
			WEIS				1042.0	1044.7	3				IIIG,V
			WEIS				1106.8	1108.3	3				IIIG,V
			OURN				1107.1	1107.3	3				IIIG
			WEIS				1140.0	1142.6	3				IIIG
	1010	2319	SGMR				1141.4	2319.0	2				IIIS
			WEIS				1153.6	1158.0	3				IIIG
			WEIS				1201.7	1205.3	3				IIIG,V
			WEIS				1220.5	1233.0	2				IIIG
			WEIS				1231.5	1233.1	3				IIIG
			SGMR				1231.6	1233.1	3				III
			WEIS				1256.7	1257.9	3				IIIG
			WEIS				1310.3	1320.0	3				IIIG
			SGMR				1310.4	1313.0	3				V
	1300	2345	HARV				1310	1337	2				IIIN
			OURN	1311.3	1313.5	2	1311.3	1314.1	3				IIIGG
			WEIS				1404.3	1409.3	3				IIIGG
			OURN				1404.6	1406.0	3				IIIG
			HARV				1404	1409	2				IIIGG
			HARV				1416		2				IIIB
			OURN				1417.1	1417.1	3				IIIB
	1435	1732	WEIS				1550.3	1554.5	3				IIIG
			HARV				1551		2				IIIG
			HARV				1628		1				IIIG
			HARV				1639		3				IIIG
			OURN	1657.8	1658.0	1							IIIG
			HARV	1658		1							IIIG
			HARV				1722	1741	2				IIIN
			HARV				1839		1				IIIG
			HARV				1908	2117	2				IIIN
	2118	2400	MANI										
			HARV				2207	2326	2				IIIN
			HARV	2258		2							IIIG
14	0000	1000	MANI							0028.5	0028.9	1	III
			MANI							0158.4	0202.2	1	IIIG
			MANI							0325.0	0327.7	1	IIIG
			WEIS				0515.5	1703.0	2				IIIN
	0513	1733	WEIS				0523.0	1724.0	2				IN
	0526	1759	OURN				0526 E	1759 D	1				I,DC
			OURN	0555.9	0556.0	1	0555.9	0556.0	1				IIIG
			WEIS				0635.5	0637.1	3				IIIG
			WEIS				0839.3	0850.5	3				IIIGG,V
			MANI							0839.6	0844.3	1	IIIG
			OURN	0841.8	0842.6	3	0841.8	0842.6	3				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
14			WEIS				0931.9	0932.7	3				IIIG
			WEIS				1032.4	1043.0	3				IIIGG,V,RS
	1008	2320	SGMR				1033.2	1037.7	3				V
			DURN				1033.3	1038.1	3				IIIGG,RS
			WEIS				1101.0	1118.0	3				IIIGG,V
			SGMR				1102.3	1112.3	3				V
			DURN	1103.4	1115.3	2	1103.5	1115.3	3				IIIGG,RS
			SGMR				1112.3	2320.0	3				CONT
			WEIS				1229.4	1243.5	3				IIIGG
	1301	2345	HARV				1301	2343	2				I
			HARV				1315	2326	2				IIIN
			WEIS				1358.7	1403.3	3				IIIGG
			DURN	1400.7	1401.1	3	1400.7	1401.0	3				IIIGG
			HARV	1401		2	1359	1404	2				IIIGG
			HARV				1633	1638	2				IIIGG
			DURN	1634.1	1634.3	1	1634.1	1634.3	3				IIIG
			WEIS				1642.9	1648.3	3				IIIGG
			WEIS				1705.1	1706.7	3				IIIG
			HARV				1705	1706	2				IIIG
			HARV				1847	1853	2				IIIGG
			HARV				2036	2037	3				IIIG
			HARV				2205	2208	3				IIIGG
	2134	2400	MANI							2206.8	2207.2	1	III
15	0000	1006	MANI							0342.0	0342.2	1	III
	0509	1208	DURN	0509 E			0509 E		2				I,DC
			WEIS				0512.0	1644.5	2				IN
			WEIS				0513.0	0935.0	2				CONT
	0511	0935	WEIS				0516	1653.5	2				IIIN
			WEIS				0529.5	0532.7	3				IIIGG,RS
			DURN	0529.5	0531.1	3	0529.5	0531.1	1				IIIGG,RS
			WEIS				0630.1	0646.0	3				IIIGG,V
			DURN	0630.7	1200 D	3							DCIM,N
			DURN	0630.7	0658.0	3	0630.7	0658.0	3				IIIGG,N
			MANI							0631.0	0639.2	1	IV
			WEIS				0650.0	0657.0	2				IIIGG
			DURN	0812.0	0818.0	3	0812.2	0818.0	3				IIIGG
			WEIS				0812.3	0817.5	3				IIIGG
			DURN				0858.4	0858.8	1				IIIG
	1007	2321	SGMR				1007.0	2321.0	1				CONT
			DURN				1009.2	1012.4	2				IIIGG
	1011	1734	WEIS				1051.8	1052.4	2				IIIG
			DURN	1052.0	1052.2	2	1052.0	1052.0	2				IIIG
			SGMR				1052.0	1052.4	3				V
			DURN	1114.5	1117.6	2							IIIGG
			DURN	1145.8	1150.7	3							IIIGG
			WEIS				1145.9	1150.8	3				IIIG,V
			SGMR				1146.0	1151.0	3				V
			WEIS				1225.8	1239.3	2				IIIGG
	1300	2345	HARV				1300	2330	2				I
			HARV				1430	2343	1				IIIN
	1438	1801	DURN				1438 E	1801 D	1				IG,DC
			SGMR				1447.0	1456.3	3				V
			WEIS				1454.2	1456.3	2				IIIG
			HARV				1454	1456	2	1455	1456	2	IIIG
			HARV				1602	1631	3	1602	1631	3	IIIGG
			WEIS				1606.5	1625.5	3				IIIGG
			DURN	1612.7	1615.4	2							DCIM
			WEIS				1612.8	1613.2	2				IIIG
			HARV				1653		3	1653		3	IIIB
			HARV				1852	1854	2	1852	1854	2	IIIGG
			HARV				1924		3	1924		3	IIIG,V
			HARV				1932	1935	3	1932	1935	3	IIIGG
			HARV				2121	2126	2	2122	2124	2	IIIGG
			HARV				2132	2139	2	2132	2138	2	IIIGG
			HARV	2157	2158	2	2158		3	2158		3	IIIG
			HARV				2341	2343	2	2342	2343	1	IIIGG
	2123	2400	MANI							2342.3	2342.7	1	III
16	0000	1003	MANI							0144.8	0145.2	1	III

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
16			MANI							0355.4	0355.7	1	III
	0508	1802	DURN				0508 E	1802 D	2				I,DC
	0505	1736	WEIS				0520.5	1453.0	2				IIIN
			MANI							0702.8	0703.0	1	III
			WEIS				0919.0	0926.5	3				IIIGG,V
			DURN	0919.4	0924.0	3	0919.4	0924.0	3				IIIGG,DCIM
			MANI							0919.5	0920.2	1	III
			DURN	0921.1	0922.5	3	0921.1	0923.0	3				II
			WEIS				0921.2	0022.3	2				II
			WEIS				1035.0	1706.0	2				IN
	1005	2322	SGMR				1234.0	1238.0	1				IIIG
			SGMR				1304.0	1500.0	1				IIIS
	1301	2351	HARV				1316	2351	1				IN,W
			SGMR				1500.0	2322.0	1				CONT
			HARV				1832	2349	1	1832	1917	1	IIIN
	2134	2400	MANI										
17	0000	1002	MANI										
	0506	0614	WEIS										
	0507	1803	DURN	0507 E	1803 D	1	0507 E	1803 D	2				I,DC
	0748	1737	WEIS				0755.0	1530.0	2				IN
			DURN	1031.5	1031.6	2	1031.5	1031.6	2				IIIG
			WEIS				1041.0	1313.2	2				IIIN
	1003	2323	SGMR				1058.8	1100.1	1				IIIG
			SGMR				1100.1	2323.0	1				CONT
			SGMR				1236.0	1236.6	2				III
			WEIS				1433.8	1434.3	3				IIIG
			SGMR				1434.1	1434.4	3				IIIG
	1301	2345	HARV				1434		2	1434		2	IIIG
			WEIS				1518.8	1519.2	2				IIIG
			HARV				1519		1	1519		1	IIIG
			HARV				1616		1	1616		1	IIIB
			DURN				1658.9	1659.4	2				IIIG
			HARV				1711	1736	1				IN,W
			HARV				1717	1730	1	1717	1730	1	IIIN
			HARV				1855	1903	1	1855	1903	1	IIIG
			HARV				1906	2250	2				I
			HARV	1906	1909	2	1906	1913	2	1906	1913	2	IIIGG
			HARV				1929	2023	2				IIIN
	2135	2400	MANI										
18	0000	1002	MANI							0109.1-	0121.7	2	IIIG
			DURN				0507 E	1805 D	1				IS
	0504	1423	WEIS				0600.0	1716.0	2				IIIN
			WEIS				0808.5	0811.7	3				IIIGG
	0508	1804	DURN				0809.3	0809.5	3				IIIG
			WEIS				1013.7	1014.7	3				IIIG
	1002	2324	SGMR				1013.9	1104.8	2				IIIS
			SGMR				1244.8	1249.0	2				IIIG
			WEIS				1247.0	1249.7	2				IIIGG
			SGMR				1340.6	1345.0	2				IIIG
			WEIS				1343.0	1344.0	3				IIIG
			DURN				1344.8	1344.9	3				IIIG
	1301	2345	HARV				1345		1				IIIB
			WEIS				1347.5	1353.7	3				IIIGG
			SGMR				1348.5	1356.0	3				IV
			HARV				1349	1351	1	1349	1351	1	IIIG
			DURN				1350.7	1350.8	3				IIIG
			SGMR				1430.2	2029.0	2				IIIS
	1444	1738	WEIS										
			HARV				1535	1935	2	1535	1935	2	IIIN
			DURN				1628.1	1628.1	2				III
			HARV				1740	1745	2	1740	1745	2	IIIG
			DURN				1750.7	1750.7	2				III
			HARV				1854	1911	3	1854	1911	3	IIIGG
			SGMR				1918.8	1923.1	3				IIIG
			HARV				1919	1928	3	1919	1928	3	IIIGG
			HARV				2029		2	2029		2	IIIB
	2152	2400	MANI										
19	0000	1002	MANI							0325.3	0325.7	1	III

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
19	0504	1740	WEIS				0544.0	0549.7	3				IIIGG
			MANI							0544.1	0545.0	1	III
	0507	1805	DURN				0544.2	0544.9	2				IIIG
			WEIS				0555.3	0615.0	2				II
			WEIS				0810.7	0811.1	2				IIIGG
			WEIS				0853.0	0853.5	1				IIIG
			WEIS				0952.8	0953.0	1				IIIB
			WEIS				1421.3	1422.2	2				IIIG
	1301	2345	HARV				1422		1				IIIG,W
			WEIS				1453.2	1453.5	1				IIIB
			WEIS				1455.2	1456.3	1				IIIG
			WEIS				1459.6	1500.3	2				UNCL
			HARV				1500	1501	1				I
			WEIS				1526.8	1527.0	1				IIIB
			WEIS				1536.5	1536.7	1				IIIB
			WEIS				1650.5	1650.7	2				IIIG
	1000	2325	SGMR				1650.8	1650.9	1				III
			HARV				1651		2	1651		2	IIIB
			HARV				2001		2	2001		2	IIIB
	2126	2400	MANI										
20	0000	1009	MANI										
	0542	1806	DURN										
	0503	1011	WEIS				0628.0	0628.7	2				IIIG
			WEIS				0655.0	0657.0	2				IIIB
	0959	2326	SGMR										
	1018	1741	WEIS										
	1301	2345	HARV				1854		1				IIIB,W
			HARV				2103		1	2103		1	IIIB,W
	2134	2400	MANI										
			HARV				2305		1				IIIG
21	0000	1000	MANI										
	0500	1727	WEIS				0619.3	1423.0	1				IIIN
			WEIS				0724.3	0727.8	3				IIIGG
			WEIS				0729.5	0732.2	2				II
			WEIS				0735.1	0739.5	3				IIIGG,RS
			WEIS				0749.5	0755.5	2				III,RS
			WEIS				0934.7	0935.8	2				IIIG
	1301	2345	HARV				1832	1834	1	1832	1834	1	IIIG
	0957	2328	SGMR				1837.5	1840.0	3				IIIG
			HARV				1837	1840	3	1837	1840	3	IIIGG
			HARV				1845	1848	2	1845	1848	2	IIIG
	2151	2400	MANI										
22	0000	1001	MANI							0053.8	0100.0	1	IIIG
	0507	1808	DURN	0759.9	0800.0	1	0759.9	0800.0	3				IIIG
	0956	2329	SGMR				1301.4	1301.6	1				III
			DURN				1339.5	1339.5	2				III
	1301	2345	HARV				1543		1				IIIB
			DURN	1550.3	1550.5	3	1550.3	1550.5	3				IIIG
			HARV	1550		1							IIIG
			HARV				1645		1	1645		1	IIIG
			HARV				1724	1726	2	1726		2	IIIG
			SGMR				1725.9	1726.1	1				III
			HARV				1738	1739	2	1738	1739	2	IIIG
			HARV				1754		1	1754		1	IIIB,W
			SGMR				1807.2	1813.9	2				IIIG
			HARV				1807	1813	3	1807	1813	3	IIIG,V
			HARV	1816		2	1816		1				IIIG
			HARV				1852	1853	1	1852	1853	1	IIIG
			HARV				1909		1	1909		1	IIIB,W
			HARV	1930		1							IIIG
			HARV	1935	1937	2	1937		1				IIIG
			HARV				2000		1				IIIB,W
			HARV				2036		1				IIIG
			HARV				2045		1	2045		1	IIIB,W
			HARV				2105		1	2105		1	IIIB,W
			HARV				2135		1				U,W
	2136	2200	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
22			HARV	2200	2202	2							IIIG
	2205	2400	MANI										
			HARV	2249	2252	1							IIIG,W
			HARV				2259		1				IIIB
23	0000	1008	MANI							0009.3	0010.2	1	III
			MANI							0120.2	0121.1	1	III
			MANI							0441.5	0442.3	1	III
	0457	1250	WEIS				0502.6	1741.0	2				IIIN
	0507	1802	DURN	0507 E	1802 D	1	0507 E	1802 D	2				I,DC
			WEIS				0538.2	0541.6	2				IIIG,U
			MANI							0539.5	0540.2	1	III
			DURN	0626.1	0633.9	3	0627.0	0627.2	2				IIIG,N
			WEIS				0632.5	1118.0	2				IN,DC
			WEIS				0713.3	0713.7	3				IIIG
			WEIS				0716.7	0717.0	2				IIIG,U
			WEIS				0754.3	0757.2	2				IIIG
			MANI							0754.4	0754.7	1	III
			DURN				0822.9	0823.4	2				IIIGG
			WEIS				0904.5	0907.2	3				IIIG,V
			MANI							0905.0	0905.6	1	III
			DURN	0910.5	0910.8	1							DCIM
			DURN	0927.4	0927.6	2	0927.4	0927.6	2				IIIG
			WEIS				0937.3	0940.6	2				IIIG
			DURN	0940.4	0940.4	3	0940.4	0940.4	3				III
			WEIS				1105.3	1105.6	3				IIIG
	0954	2330	SGMR				1105.4	1111.9	2				IIIS
			WEIS				1110.3	1112.5	3				IIIG
			DURN	1156.5	1156.6	3	1156.5	1156.6	3				IIIG
			SGMR				1207.0	2330.0	1				CONT
			DURN	1216.9	1216.9	1							III
			DURN	1219.2	1220.3	1	1219.2	1220.3	3				IIIG
			SGMR				1219.3	1310.0	2				IIIS
	1301	2345	HARV				1301	1312	1				I,W
			SGMR				1308.0	1310.1	3				IV
			HARV				1308	1309	2	1308	1309	2	IIIG
			HARV				1350	1351	1				IIIG,W
	1330	1744	WEIS				1507.2	1511.8	3				IIIG
			HARV	1507		1							IIIB
			DURN				1508.3	1508.3	2				III
			HARV				1508	1512	2	1508	1512	2	IIIG
			DURN				1511.4	1511.7	3				IIIG
			HARV				1531	1538	1				IIIN
			HARV				1618	1629	1				IIIN
			WEIS				1635.9	1637.5	3				IIIG
			HARV				1637	1639	2	1637	1639	2	IIIG,V
			HARV				1708	1721	1				IIIN
			HARV				1724		3	1724		3	IIIG
			HARV				1739	1746	2	1739	1742	2	IIIGG,V
			HARV				1818	1905	1	1818	1905	1	IIIN
			SGMR				1946.6	1949.3	3				V
			HARV				1946	1949	3	1946	1949	3	IIIGG,V
			HARV				2017	2029	2				IIIN
			HARV				2018	2045	3	2024	2045	2	II
			HARV				2018	2025	1				I
			SGMR				2019.2	2030.8	3				II
			HARV				2046	2047	1	2047		1	IIIG,W
			HARV				2131	2150	2	2131	2150	2	IIIN
	2132	2400	MANI										
			HARV				2243		1				IIIB,W
24	0000	1002	MANI							0200.0	0202.0	2	IIIG
	0458	1810	DURN				0458 E	1810 D	1				IS,W
	0455	0727	WEIS				0530.2	1740.0	2				IIIN
			WEIS				0723.3	0724.8	2				IIIG
			MANI							0724.3	0724.4	1	III
	0729	1746	WEIS										
	0953	2331	SGMR				1227.5	1227.9	1				III
			SGMR				1318.8	1600.0	1				IIIS
	1301	2345	HARV				1605		1				IIIB,W

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
24			HARV				1740		2	1740		2	IIIB
			HARV				2000	2002	1	2000	2002	1	IIIG
	2132	2400	MANI										
			HARV				2144	2146	1	2144	2146	1	IIIG
25	0000	0214	MANI										
	0239	1003	MANI										
	0451	0545	WEIS										
	0621	1748	WEIS				0900.9	0903.1	3				IIIG
			WEIS				0905.0	1707.3	2				IIIN
	0457	1812	OURN	1325.5	1326.8	1	1325.5	1326.8	1				IIIGG
			OURN	1334.5	1339.9	3	1334.5	1339.9	3				IIIGG,N
	1301	2345	HARV	1335	1340	1	1335	1338	1				IIIG
			WEIS				1430.1	1430.4	3				IIIG
	0951	2332	SGMR				1431.4	1431.6	2				III
			HARV				1431		2	1431		2	IIIB
			OURN	1544.6	1544.8	3							IIIGG
			HARV				1707		1	1707		1	IIIB
	2131	2147	MANI										
			HARV				2159		1				IIIB
	2202	2400	MANI										
			HARV	2208	2216	2	2209	2216	2				IIIN
			HARV				2247		1				IIIG
26	0451	1403	WEIS				0455.0	1726.0	2				IIIN
	0000	0932	MANI							0750.2	0750.4	1	III
	0456	1813	OURN				0750.3	0750.5	2				IIIG
			WEIS				0750.3	0751.3	3				IIIG
			OURN	0910.8	0911.3	2	0910.8	0911.3	2				IIIG
			WEIS	1111.5	1114.3	2							IIIG
			OURN	1111.6	1114.3	3	1111.6	1114.3	1				IIIGG
			OURN				1229.4	1229.5	3				IIIG
	0950	2333	SGMR				1338.0	2333.0	1				CONT
			OURN	1456.2	1456.3	2	1456.2	1456.3	1				IIIG
			SGMR				1521.2	1521.6	1				III
			OURN	1634.8	1635.5	2	1635.2	1635.5	2				IIIG
	1301	2345	HARV	1635		1							IIIG
			HARV				1707	1726	2	1707	1726	2	IIIN
			SGMR				1715.2	1755.0	2				IIIS
			OURN				1719.2	1719.5	2				IIIG
	1420	1749	WEIS				1719.2	1719.7	3				IIIG
			HARV	1955	1958	2	1955	1958	2	1958		1	IIIN
			HARV				2133	2136	2	2133	2136	2	IIIGG
	2231	2400	MANI										
27	0000	1001	MANI							0035.7	0036.3	1	III
	0455	1750	WEIS				0612.7	1649.0	2				IIIN
			WEIS				0812.9	0813.6	3				IIIG
	0740	1814	OURN	0813.1	0813.4	3	0813.1	0813.4	3				V
			WEIS				1010.7	1018.0	3				IIIGG,V,RS
			OURN	1012.5	1014.7	3	1012.5	1014.7	3				IIIGG
	0948	2334	SGMR				1012.9	1015.5	2				IIIG
			SGMR				1153.1	1153.4	1				III
			SGMR				1439.9	1446.5	2				IIIG
			SGMR				1604.9	1607.0	2				IIIG
			WEIS				1604.9	1607.8	3				IIIG
	1301	2345	HARV				1605	1608	2	1605	1608	2	IIIG
			HARV				1615		1	1615		1	IIIB
			HARV				1648		1	1648		1	IIIB
			HARV				1754	1757	2	1754	1757	2	IIIG
			HARV				1830	1839	1	1830	1839	1	IIIN
			HARV				1934		1	1934		1	IIIB
			HARV				1957	1958	1	1957	1958	1	IIIG
	2133	2400	MANI										
28	0000	1002	MANI										
	0453	0556	OURN										
	0448	0809	WEIS				0509.5	1000.7	1				IIIN
	0825	1752	WEIS				0516.8	1023.0	1				IN
	0634	0823	OURN	0822.1	0822.9	1	0822.1	0822.9	3				IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
28			WEIS				1201.2	1203.7	3				IIIG
	0947	2335	SGMR				1205.6	1207.7	3				IIIG
			DURN	1315.5	1324	3	1318	1324	3				II
			WEIS	1315.5	1318.6	3							IV, P
			WEIS				1315.5	1322.5	3				IIIGG
			DURN	1317	1416	3	1317	1416	3				IV, F
	1103	1816	DURN				1317	1816 D	1				IS
			WEIS				1318.5	1323.0	3				IIIG
			SGMR				1318.6	1324.2	3				V
			WEIS				1319.0	1540.0	3				IV, P
			SGMR				1323.0	1337.9	3				II
			SGMR				1324.0	1338.3	3				IV
			SGMR				1338.3	1603.0	2				CONT
			DURN	1422	1800								DCIM,N
	1528	2346	HARV				1528	1554	1				IN
			HARV	1530	1717	3							IVN
			DURN				1806.0	1806.4	1				IIIG
			HARV				1806	1817	1	1815	1817	2	IIIN
			HARV				1951		1				IIIB
	2132	2400	MANI										
			HARV				2158		2	2158		2	IIIB
			HARV	2342	2346	1	2338	2346	2				IIIN
29	0000	1005	MANI										
	0452	1817	DURN				0452 E	1530	1				I,DC
	0447	1554	WEIS				0623.3	1352.5	2				IIIN
			DURN	0630.1	0630.3	1	0629.9	0630.3	3				IIIG
			DURN	0943.3	0945.7	3							IIIG,RS
			WEIS	1135.5	1149.6	3							IIIGG
			DURN	1135.5	1135.8	1	1135.5	1135.8	3				IIIG
	0945	2337	SGMR				1135.7	1144.7	2				IIIG
			SGMR				1326.4	1327.0	2				V
	1301	2345	HARV				1327		1				IIIB
			SGMR				1353.3	1353.5	1				III
	1610	1753	WEIS										
			HARV	1857	2031	3	1900	2031	3	1908	2050	3	IV
			HARV	1857	2031	3	1900	2031	3	1908	2050	3	IV
			HARV				1903	2056	3	1903	2056	3	IIIS,I
			SGMR				1906.0	1908.0	2				IIIG
			SGMR				1908.0	2015.0	3				IV
			HARV				1908	1913	2				II
			SGMR				1916.5	1925.0	3				II
			HARV				1916	1921	3	1916	1921	3	H
			SGMR				2015.0	2115.0	2				CONT
	2140	2400	MANI										
			HARV				2208	2210	2				IIIG
			SGMR				2209.3	2209.7	1				IIIG
30	0000	1005	MANI										
	0450	1818	DURN	0454.7	0455.2	3							DCIM
	0444	1754	WEIS				0501.8	1434.0	3				IIIN
			WEIS				0750.3	0750.4	2				IIIB
			WEIS				0808.8	0815.3	3				IIIGG
			DURN	0808.9	0816.8	3	0808.9	0816.8	3				IIIGG
			WEIS				0920.7	0921.2	2				IIIG
			WEIS				0948.2	0949.8	3				IIIG
			DURN	0948.9	0949.6	2	0948.8	0949.1	1				IIIG,RS
			WEIS				1003.6	1005.9	3				IIIG
	0944	2338	SGMR				1005.0	1120.0	1				IIIS
			DURN				1100	1818	1				I,DC
			DURN	1219.5	1220.5	3							IIIG
			WEIS				1256.9	1257.3	3				IIIG
			SGMR				1257.0	1257.4	1				III
			WEIS				1339.6	1340.5	3				IIIG
			SGMR				1340.3	1340.7	2				III
	1245	2245	HARV				1340		2				IIIB
			HARV	1438	1443	2							IV
			WEIS	1440.0	1631.0	3							IV, P
			DURN	1441	1632	3	1441	1632	3				IV
			WEIS				1442.5	1445.6	3				IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

APRIL 1978

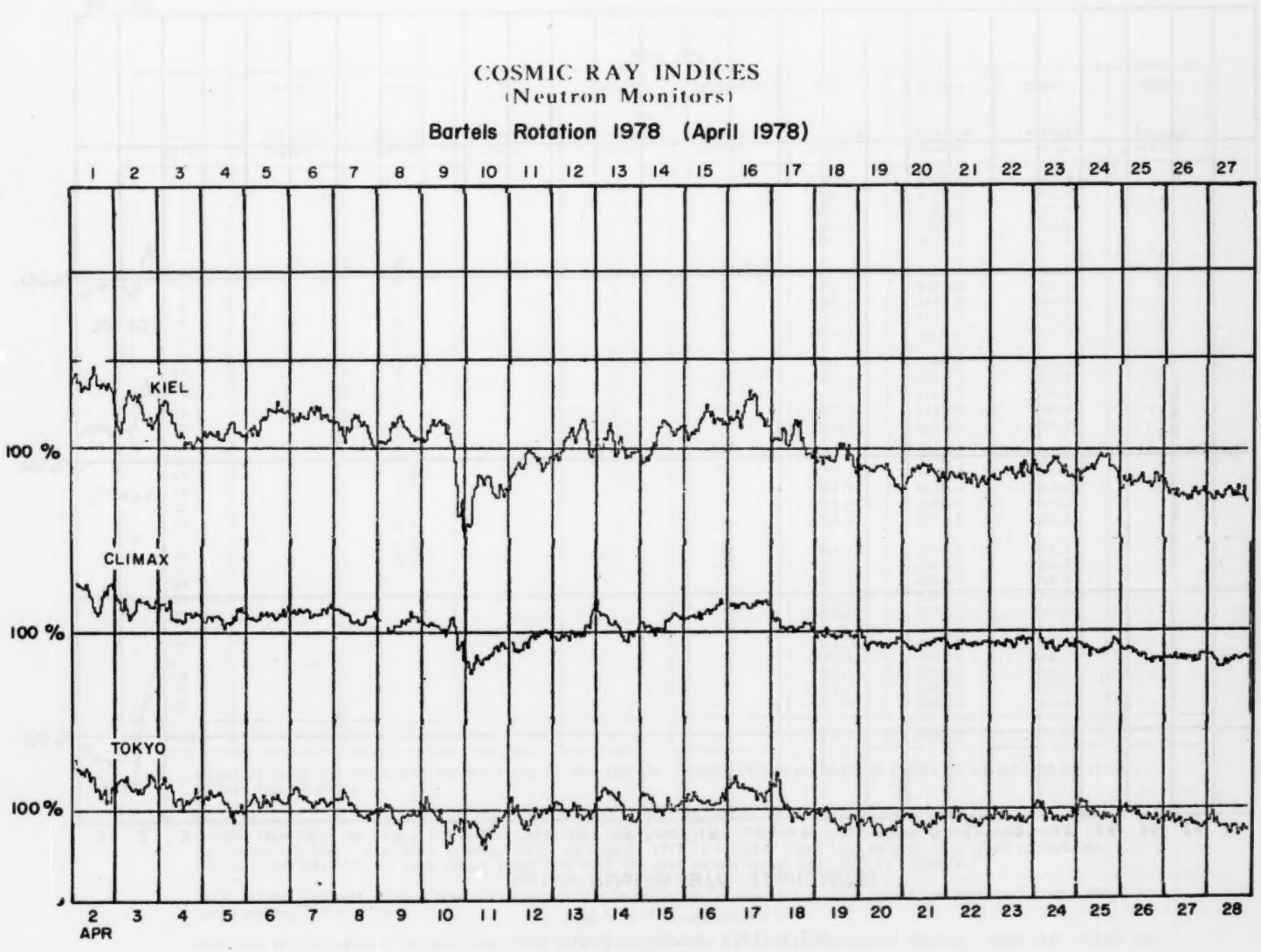
APR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
30			HARV				1442	1550	2				IIIN
			HARV	1443	1606	3	1446	1620	3				IV
			WEIS				1445.5	1720.0	3				IV, P
			SGMR				1445.7	1457.8	3				IV
			HARV				1446	1502	3	1446	1502	3	II
			HARV				1446	1548	2				IIIGG,RS
			SGMR				1450.8	2338.0	2				CONT
			SGMR				1551.8	1552.5	3				IV
			HARV				1551	1552	3	1552		3	IIIGG
			HARV				1606	1735	1				I
			DURN	1633.6	1633.9	2	1633.6	1633.9	1				IIIG
			HARV				1640	1646	2	1640	1646	2	IIIN
			HARV				1736	2058	2	1736	2058	2	I
			HARV				1808	2058	2	1808	2058	2	IIIN
			SGMR				1958.1	1958.8	3				III
			HARV	1958	1959	1	1958	1959	3	1958	1959	3	IIIG
	2127	2400	MANI										
			HARV				2138	2245	2				IN
			HARV				2145	2220	2				IIIN

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

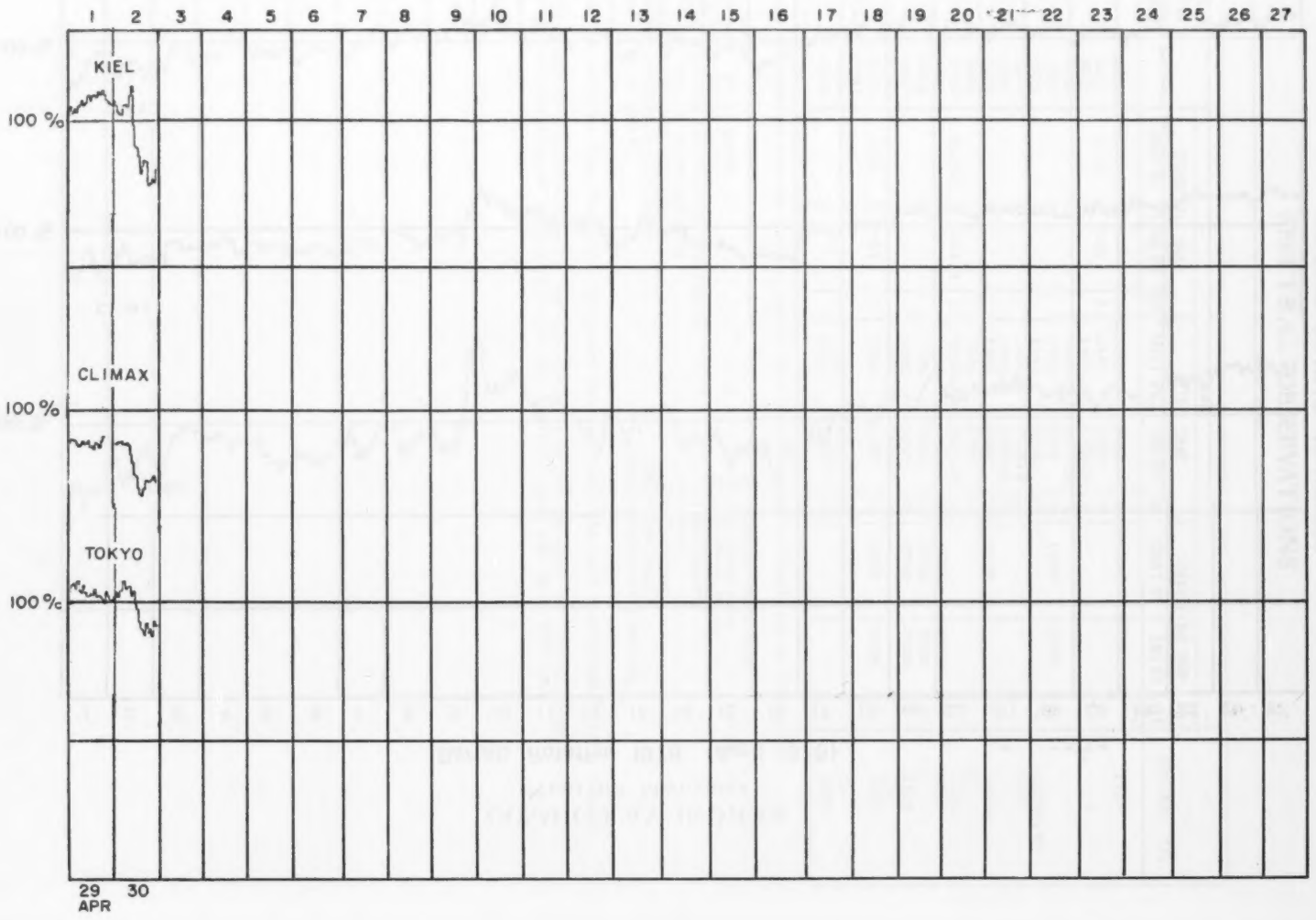
Note: No data from Dwingeloo Solar Radio Observatory were recorded because the radio spectrograph is being retuned.

Errata: Manila January 1978 spectral data are reprinted correctly in this SGD issue, 406 Part II, pages 70-71. Some of these data appeared incorrectly in the SGD, 403 Part I, page 136, March 1978 issue.


COSMIC RAY INDICES
(Neutron Monitors)
Bartels Rotation 1978 (April 1978)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
KIEL
100 %
CLIMAX
100 %
TOKYO
100 %
2 APR 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1978 (April 1978)



COSMIC RAY INDICES

(Neutron Monitors)

APRIL 1978

April 1978	THULE Average cts/hr	ALERT Average cts/hr	DEEP RIVER Average cts/hr	CALGARY Average cts/hr	SULPHUR MT. Average cts/hr	KIEL Average cts/hr	CLIMAX Average cts/hr	TOKYO Average cts/hr	KULA Average cts/hr
1						6343.1	4303.6	3641.6	
2						6336.6	4287.2	3633.4	
3						6243.1	4233.9	3626.5	
4						6186.7	4194.0	3606.9	
5						6173.1	4173.5	3590.4	
6						6221.2	4187.0	3596.0	
7						6232.8	4203.6	3599.5	
8						6189.0	4181.9	3583.4	
9						6174.5	4152.7	3570.1	
10						6123.1	4119.0	3554.8	
11						5969.4	3996.2	3542.8	
12						6072.6	4073.3	3568.5	
13						6147.0	4111.1	3576.2	
14						6132.5	4135.8	3588.2	
15						6159.5	4146.2	3587.8	
16						6210.1	4196.5	3595.6	
17						6242.8	4232.3	3616.2	
18						6153.5	4136.2	3583.1	
19						6098.0	4090.4	3555.6	
20						6043.2	4057.6	3542.6	
21						6041.1	4046.9	3551.2	
22						6023.3	4047.1	3555.7	
23						6044.5	4054.8	3558.9	
24						6057.9	4045.1	3566.0	
25						6066.0	4030.7	3567.5	
26						6016.9	3994.9	3562.5	
27						5977.6	3983.6	3548.3	
28						5971.0	3972.3	3540.3	
29						5976.7	4500.2	3533.6	
30						5857.3	3865.3	3502.6	
MEAN						6116.1	4123.2	3502.6	

Data not available at time of publication.

Data will be published next month -- NGSDC computer problems.

Data not available at time of publication.

Data not available at time of publication.

Data not available at time of publication.

Data not processed at time of publication -- NGSDC paper tape problems.

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Notes: Tokyo neutron monitor counting rate increased by 2.0/1.5 since the beginning of September 1977. The number of counters changed from 27 to 36. Since the scaling factor has been changed, the listed figures are nearly the same as those in and before May 1977. The level in June, July, and August, 1977 is slightly lower than before. The level in September 1977 has been adjusted, so that direct comparison with the data in and before May, 1977 is possible.

Thule, Alert, Calgary, Sulphur Mountain, Kiel, Climax and Kula Scaling Factors = 100. Deep River Scaling Factor = 300. Tokyo Scaling Factor = 256.

Kula data are available on magnetic tape from the World Data Center A for Solar-Terrestrial Physics. These data include the periods July 1967-December 1970 and October 1975 to the present.

GEOMAGNETIC ACTIVITY INDICES

APRIL 1978

Day		Three-Hourly Indices Kp									Three-Hourly Indices Km								Ap	aa *					Cp
		1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8		N	S	M			
1	Q8A	4	4-	3	1+	1	2	2-	2+	19	3+	3-	3-	2-	1	3-	2+	2+	12	17	20	19	19		0.7
2		4-	4-	1	2	2+	2	3-	5-	22	3+	3-	1	2-	2+	2+	3-	4+	15	35	18	23	31		0.9
3		2	5+	5+	3+	3	4	6-	6	35-	2	4+	4	4-	3+	4-	5-	5	41	55	51	46	60		1.5
4	Q4	5+	5	5-	2+	2-	5+	7	6+	38-	5-	5-	4	3-	2-	5-	5+	6-	55	73	57	50	81		1.6
5		5+	5	3-	1+	2	2-	3+	3	24+	5-	4+	3-	1+	2-	2-	3	3-	21	29	28	40	18		1.1
6	Q9A	3-	3	2	2	3	2-	2-	2-	18-	2+	3-	2-	2	2+	2-	2-	2-	9	14	13	14	13	CC	0.5
7	Q2	2-	0+	0+	1+	2-	1-	2	2+	10+	1+	0	1-	1	2-	0+	2-	2	5	10	6	8	9	CC	0.2
8	Q1	1-	2-	1	1	2-	2	2-	1+	11	1	1	1	1-	2-	2	2	2-	5	9	7	5	11	CC	0.2
9	Q3	1	3-	2	2	1+	1+	1	1+	13-	1	2+	2-	2-	1	1	1	1+	6	11	7	10	8	CC	0.3
10		1-	2-	1+	2-	4+	5-	5-	7+	26+	1-	1+	1	1	4-	4-	4	6+	36	52	28	6	73		1.4
11	D1	8-	6+	5	3	4-	6-	5+	4+	41	6	5+	5	3	3	4+	4+	4+	64	79	48	68	60		1.7
12		7-	3-	4	3+	3-	3+	4-	3-	29	5+	3-	3+	3	2	3-	3+	3-	29	32	29	41	21		1.3
13		3+	2+	2+	2+	4-	3	5-	6-	27+	3	2	2	2+	3+	3	4	5	24	36	33	16	53		1.1
14	D2	6-	4+	4+	6-	6+	4+	5+	4	40	5-	4-	4	5	6-	4-	5-	4-	51	73	56	63	65		1.6
15		5-	4-	4-	3+	3+	3	2+	2	26	4-	3	3+	3	3+	3	2+	2+	19	31	26	32	25		1.0
16	Q6A	3	2+	2	1+	1	1	2+	2	15	3-	2	2	2	1+	1-	2	2-	8	15	18	20	14		0.4
17	Q5A	2-	1+	2	1+	2-	1+	1	3	13+	1+	1+	2	1+	2	1+	1-	3-	7	14	10	11	14	C	0.3
18		4	5-	3	2-	1+	4	3+	3-	25-	4-	4	3	2	1+	3+	3	3-	19	33	28	30	24		1.0
19		2-	4-	5+	4	5	5	6-	4+	35-	1+	3+	4+	3	4+	4+	5	4-	38	51	55	32	73		1.4
20		6-	4+	3	3	2-	4-	2+	3+	27	5-	4-	3	3	2	3	2+	3-	23	38	27	43	23		1.1
21	Q8A	3-	2	2+	1+	3-	2	2+	2+	18-	2+	2-	2	1	3	2-	2+	2+	9	18	16	11	23		0.5
22	Q7A	1	2	1+	2-	3-	2	3-	3	16+	1	2-	1	2	2+	2-	2+	3-	8	16	7	8	16	C	0.5
23		3+	3-	3-	3-	4+	4+	4-	4+	28	3	3-	2+	3	3+	4+	3+	4	22	38	31	24	25		1.1
24	D5	6	6-	5	4+	5-	6-	3+	4+	39	5-	5-	5-	4	4-	4+	3-	4	48	62	61	67	57		1.6
25		5-	3	3+	3	3-	3	3-	2+	25-	4+	3-	3	3	2+	3-	3-	2+	17	23	32	32	23		0.9
26		4-	4	4	2+	3-	3	3	3	26-	4-	4-	4-	2+	3-	3-	3	3-	18	30	28	32	26		1.0
27		3+	2+	2+	3+	2+	4-	3	4	24+	3	2	2+	3-	2+	3+	3-	4	16	32	30	28	35		0.9
28		3+	3+	2+	3-	3	2	3-	1+	21-	3	3	3-	2	3-	2-	3-	2-	12	25	12	18	20		0.7
29	Q4	2+	1	1	1	2	1+	2+	2+	13+	2+	1	1	1	2-	1	2+	2+	6	13	10	7	16	C	0.3
30	D3	3+	3-	2	5	7-	8	4-	5-	36	3	2+	2-	5-	5-	6	3	4	58	85	48	33	93		1.7
																			23	35.0	27.4	31.4			0.99

Day	Three-Hourly Indices Kn								Three-Hourly Indices Ks							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1	3+	3	3-	2-	1	3-	2	3-	3+	3-	3-	1+	1-	3-	2+	2+
2	3+	3-	1	2-	2+	2+	3-	4-	3	3-	1	2	2	3-	2+	5-
3	2+	4+	4	4-	4-	4-	5-	5	2	4	4	3+	3+	4-	5-	5
4	4+	5-	4-	3-	1+	5-	5+	6-	5	4	4	3-	2-	5-	5+	6-
5	5-	5-	3-	2-	2-	2+	3	3	5	4	3-	1+	2-	1+	3-	2
6	2+	3-	2-	2-	3-	2	2	2	2+	3-	1+	2	2	1+	1+	1+
7	1	0	1-	1	2+	1	2-	2+	1+	0	0+	1-	1	0	1+	2-
8	1+	1+	1+	1	2-	2+	2+	2	1-	1-	1-	1-	1+	2	1+	1+
9	1+	3-	2	2	1+	2-	1+	2	1	2	2-	1+	1-	0+	0+	1-
10	1	1+	1	1+	4	4	4	6+	1-	1+	1	1-	3+	3+	4-	6+
11	6+	5+	5+	3	3+	5	5-	4+	6-	5	5-	3-	3-	4-	4	4
12	5+	2+	4-	3	2+	3	3	3-	5+	3	3	3	2-	3-	3+	3-
13	3	2	2+	2+	3+	3	4	5-	3-	2	2	2	3	3-	4	5
14	5-	4-	4+	5	6-	4	4	4-	5	4-	4-	5	5+	4-	5+	3+
15	4-	3	3+	3-	3+	3-	2+	2+	4-	3	3+	3	3+	3	2+	2+
16	3-	2	2+	2	2-	1+	2+	2-	3-	2	2-	2	1	0+	2-	2
17	1+	1+	2	2-	2+	2-	1	3	1+	2-	2	1+	2-	1	0+	2+
18	3+	4-	3+	2+	2-	4-	3	3	4	4+	3-	2-	1	3-	3-	2
19	2-	4-	5-	3+	4+	4+	5	4-	1	3+	4+	3	4+	4	5	4-
20	5-	4-	3	3	2	3+	2+	3	5	4-	3	3	2-	3-	2+	2+
21	3-	2	2+	1+	3	2	2+	3-	2+	2-	2-	1-	3-	2-	2+	2-
22	1+	2	1+	2+	3-	2+	3-	3-	1-	1+	0+	1+	2-	1	2	3-
23	3-	2+	2+	3	4-	4+	3+	4	3+	3	2	3-	3-	4	3+	4-
24	5	5-	4+	4-	4-	4+	3	4	5-	5-	5-	4	4-	4+	3-	4+
25	4-	2+	3	3	3-	3	3-	3-	5-	3	3-	3	2	3-	3	1+
26	3+	3+	4-	2+	3	3	3-	3	4-	4-	4	2+	2	3-	3+	3-
27	3	2	2+	3	2+	3+	3	4	3	2-	2	3-	2	4-	2+	4-
28	3	3-	3-	2	3-	2	3-	2	3+	3	2+	2	3-	1	2+	1+
29	2	1	1+	1+	2-	1+	3-	2+	2+	1-	1-	1-	1+	1	2	2+
30	3-	3-	2	5-	5+	7-	3+	4	3	2	2-	4	4	6-	3-	4-

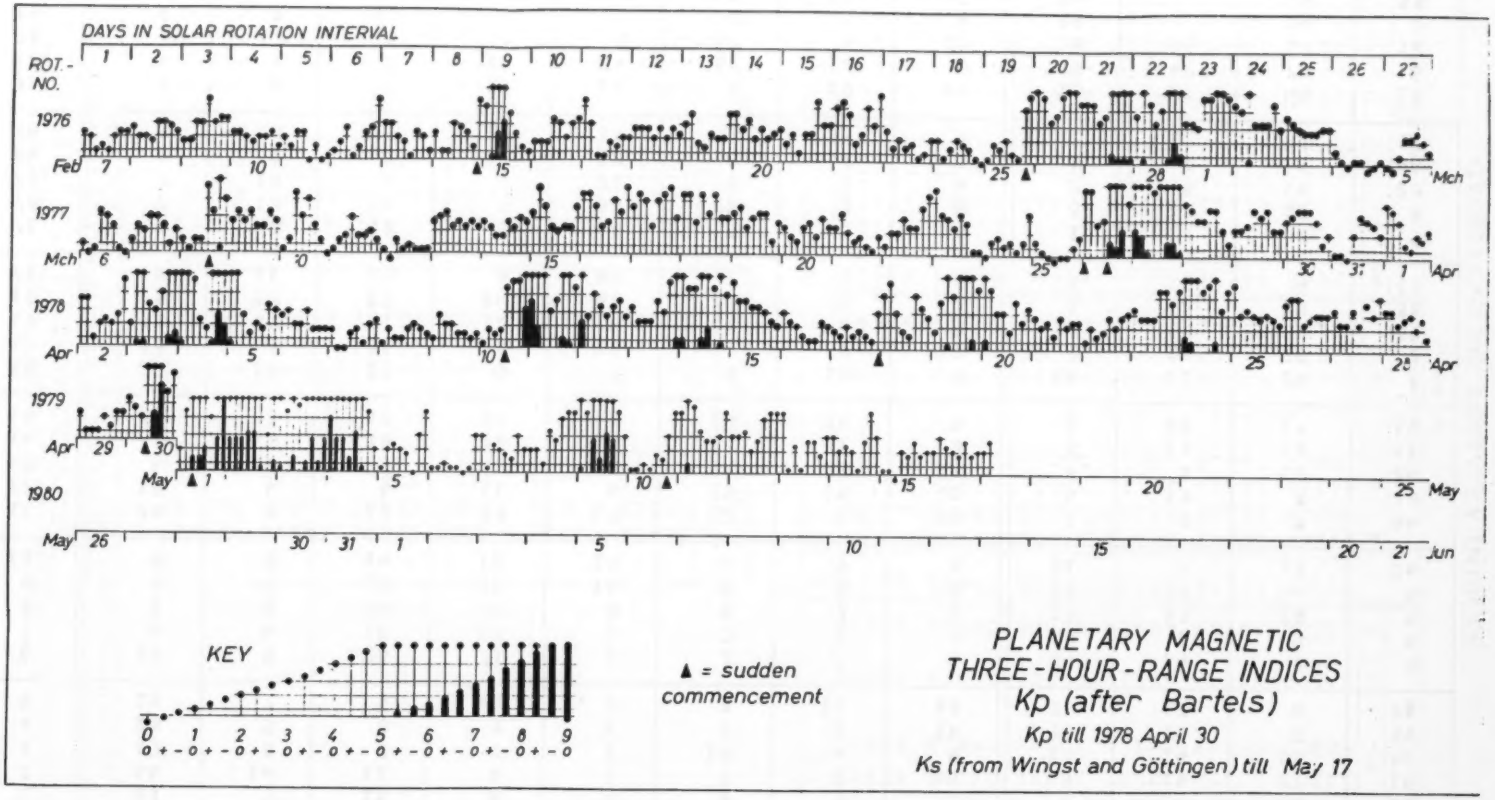
Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap ≤6 but one Kp ≥3o or two Kp values ≥3-"). An * means "not really disturbed" (Ap<20).

Geomagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

DAILY AVERAGE INDICES Ap

	1977								1978			
DAY	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
1	13	9	15	6	4	4	5	6	7	15	33	12
2	66	14	11	4	6	5	6	69	8	14	27	15
3	15	6	9	7	8	10	4	9	13	14	15	41
4	19	5	8	9	6	7	8	14	89	11	3	55
5	11	7	5	40	3	8	10	18	31	17	6	21
6	10	5	28	21	4	8	7	5	34	14	7	9
7	6	6	15	17	6	3	5	3	13	7	9	5
8	3	6	14	12	8	6	3	2	19	10	20	5
9	7	6	16	20	11	2	3	3	23	16	14	6
10	9	8	14	12	13	4	9	4	21	7	12	36
11	24	4	10	28	19	12	6	38	7	5	7	64
12	19	4	4	11	6	28	18	21	4	10	3	29
13	6	6	9	11	28	14	26	16	8	8	12	24
14	8	9	18	12	10	13	42	8	3	11	10	51
15	14	3	12	11	9	19	25	5	2	48	17	19
16	22	10	27	9	7	8	14	9	14	11	24	8
17	18	8	14	29	10	12	8	12	9	10	25	7
18	11	10	7	13	6	22	6	3	12	10	24	19
19	5	10	23	24	42	28	6	3	6	12	15	38
20	10	11	29	8	44	7	4	4	3	12	9	23
21	4	6	10	5	64	5	5	6	1	12	7	9
22	7	10	11	5	63	22	3	6	3	22	13	8
23	7	10	6	6	21	6	2	4	2	6	15	22
24	8	7	7	10	12	6	2	5	6	5	6	48
25	5	5	5	27	10	4	15	5	12	12	3	17
26	2	6	3	13	18	6	19	11	12	37	49	18
27	4	7	3	14	24	62	12	6	5	42	70	16
28	7	12	4	7	9	47	5	10	9	46	17	12
29	2	7	61	6	3	9	6	8	36		14	6
30	5	9	17	5	4	9	12	5	36		16	58
31	7		8	4		6		6	23		8	
MEAN	11	8	14	13	16	13	10	10	15	16	16	23

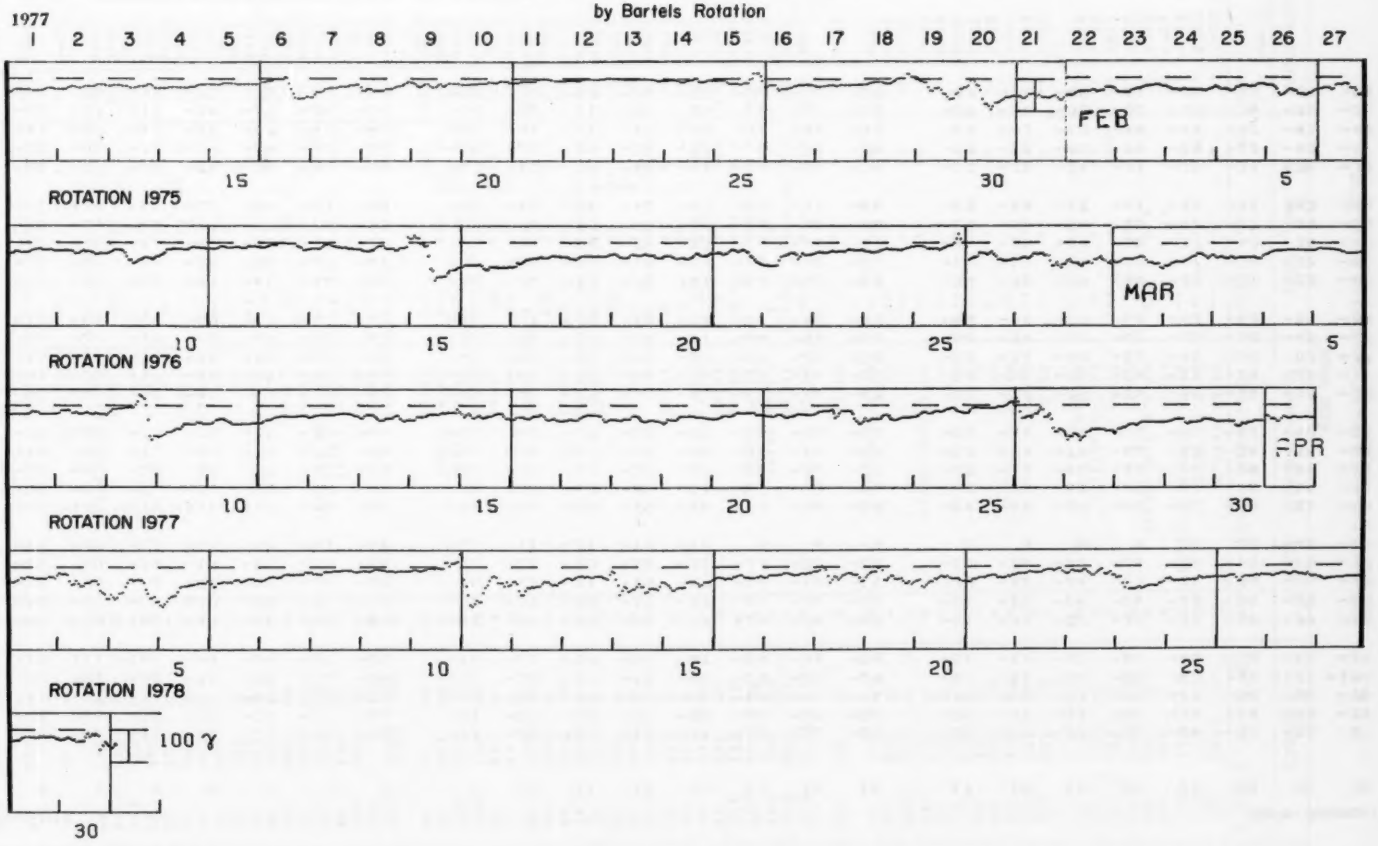
GEOMAGNETIC ACTIVITY INDICES



GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst

by Bartels Rotation



Note the sensitivity indicator for each month on the last day of the month and also note that the zero reference level is different for each month.

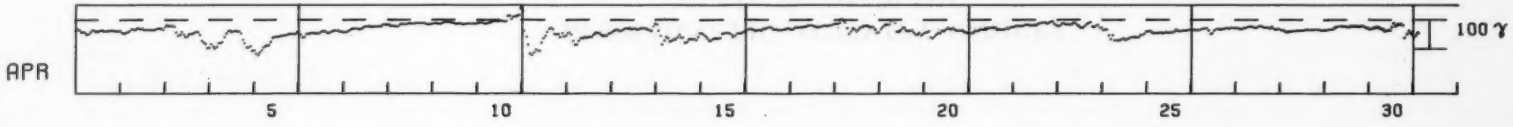
HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

APRIL 1978

NASA/GODDARD SPACE FLIGHT CENTER

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-33	-36	-42	-41	-43	-50	-49	-42	-37	-38	-41	-40	-37	-36	-38	-39	-38	-37	-37	-36	-39	-39	-38	-37
2	-44	-42	-44	-42	-38	-33	-35	-36	-31	-29	-32	-32	-35	-34	-34	-35	-34	-37	-33	-30	-30	-29	-35	-25
3	-16	-21	-21	-15	-24	-42	-54	-51	-40	-56	-57	-58	-49	-47	-46	-41	-35	-42	-52	-71	-77	-82	-96	-95
4	-82	-90	-96	-91	-79	-79	-75	-59	-47	-38	-37	-41	-38	-38	-39	-39	-46	-68	-80	-95	-92	-89	-107	-104
5	-115	-120	-111	-104	-94	-89	-87	-85	-75	-62	-58	-58	-57	-55	-53	-54	-51	-50	-47	-48	-48	-50	-43	-39
6	-50	-60	-58	-49	-47	-46	-43	-47	-47	-46	-45	-40	-38	-39	-44	-45	-41	-38	-36	-36	-37	-40	-39	-42
7	-41	-40	-36	-32	-30	-29	-31	-33	-31	-30	-30	-32	-32	-31	-30	-31	-31	-29	-24	-24	-25	-25	-29	-28
8	-31	-32	-29	-23	-21	-21	-20	-20	-18	-19	-21	-19	-17	-18	-19	-19	-20	-22	-24	-24	-21	-20	-19	-19
9	-22	-22	-18	-14	-14	-16	-16	-18	-20	-22	-20	-20	-21	-23	-21	-22	-20	-20	-20	-20	-19	-18	-15	-17
10	-20	-21	-20	-16	-15	-12	-11	-12	-13	-11	-11	-13	-14	0	6	-5	2	3	6	9	31	22	-46	-66
11	-92	-122	-127	-119	-110	-113	-113	-87	-71	-65	-50	-39	-36	-40	-50	-58	-58	-65	-53	-64	-62	-53	-51	-58
12	-80	-92	-93	-79	-70	-70	-67	-69	-66	-67	-65	-59	-53	-53	-53	-59	-63	-60	-63	-55	-53	-48	-44	-40
13	-43	-46	-45	-38	-36	-37	-35	-39	-37	-37	-40	-39	-37	-36	-36	-37	-40	-44	-46	-31	-22	-26	-45	-63
14	-92	-79	-67	-71	-83	-79	-75	-74	-68	-59	-67	-69	-86	-84	-74	-73	-72	-74	-78	-66	-53	-54	-58	-63
15	-70	-78	-80	-73	-70	-71	-72	-69	-65	-63	-62	-62	-64	-69	-65	-62	-56	-54	-55	-51	-47	-43	-40	-38
16	-41	-42	-46	-42	-43	-45	-39	-38	-35	-33	-33	-39	-40	-41	-42	-43	-42	-39	-39	-35	-39	-40	-38	-33
17	-33	-34	-33	-32	-31	-30	-27	-26	-28	-29	-32	-34	-34	-31	-28	-26	-30	-26	-26	-24	-21	-20	-20	-16
18	-5	-10	-15	-36	-56	-48	-38	-39	-46	-40	-34	-31	-27	-27	-28	-32	-33	-31	-40	-51	-49	-39	-33	-27
19	-23	-22	-22	-12	-8	-19	-44	-51	-42	-36	-37	-44	-47	-44	-43	-51	-58	-59	-52	-61	-55	-52	-49	-47
20	-67	-71	-64	-58	-53	-53	-48	-47	-42	-37	-38	-40	-36	-41	-45	-45	-45	-44	-49	-52	-53	-53	-54	-53
21	-45	-45	-44	-40	-41	-41	-40	-36	-35	-34	-33	-36	-41	-40	-42	-42	-39	-36	-39	-34	-32	-31	-28	-28
22	-28	-29	-27	-24	-24	-26	-27	-27	-27	-25	-21	-18	-16	-16	-17	-21	-16	-13	-14	-21	-27	-30	-27	-20
23	-20	-23	-24	-25	-23	-17	-14	-24	-29	-35	-36	-29	-23	-16	-15	-31	-34	-28	-24	-35	-37	-42	-39	-40
24	-61	-73	-60	-73	-77	-77	-76	-73	-70	-76	-73	-69	-66	-66	-66	-68	-68	-60	-59	-55	-47	-47	-44	-50
25	-59	-52	-54	-51	-52	-54	-51	-50	-52	-49	-52	-48	-41	-44	-47	-46	-42	-44	-43	-41	-40	-41	-43	-43
26	-42	-42	-39	-37	-38	-36	-45	-56	-53	-43	-39	-40	-42	-39	-39	-36	-37	-39	-34	-37	-35	-37	-36	-39
27	-39	-35	-36	-31	-30	-29	-33	-36	-34	-29	-29	-33	-35	-33	-36	-38	-33	-38	-40	-39	-38	-43	-43	-47
28	-51	-47	-47	-46	-45	-47	-43	-45	-45	-44	-41	-41	-42	-42	-42	-40	-40	-41	-42	-44	-42	-42	-41	-40
29	-39	-40	-37	-32	-29	-29	-25	-31	-32	-33	-31	-29	-29	-26	-31	-30	-29	-30	-32	-35	-37	-39	-38	-36
30	-34	-30	-35	-38	-39	-45	-42	-43	-41	-30	-18	-29	-23	-22	-23	-27	-69	-56	-45	-51	-56	-63	-61	-52



PRINCIPAL MAGNETIC STORMS

APRIL 1978

OBS. 2 letter IAGA code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(γ)	Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(γ)	Z(γ)	UT END DAY	HOUR
CO	64.6N	2	21--	..	..	..	..	03(6) 04(6,7)	6	171	1330	800	05	11
NE	55.1N	2	2058	..	..	..	..	04(2,8) 05(2)	6	53	253	264	05	10
FR	49.6N	2	20--	..	..	..	..	03(8) 04(2,8) 05(1,2)	5	19	112	117	06	06
SJ	29.9N	2	2057	SC	--	+7	+2	03(7)	5	7	136	39	05	06
HD	07.6N	2	2055	SC		+ 9	- 1	03(2,4,7,8) 04(3)	4	6	130	28	04	11
GU	04.0N	2	2057	..	..	..	..	03(2)	5	10	150	30	05	09
HU	00.6S	2	1100	..	..	..	..	04(6)	6	6	353	23	05	06
PH	18.7S	2	20..	..	..	..	..	03(2,4),4(3,7)	5	6	150	70	05	09
HR	33.7S	2	2100	..	..	..	..	04(6,8)	6	36	143	131	05	09
SI	60.0N	3	05--	..	..	..	..	04(3)	6	60	530	400	05	06
NI	54.2N	3	16--	..	..	..	..	04(7)	7	45	230	125	05	06
IR	41.0N	3	0400	..	..	..	..	04(7)	6	26	151	59	05	12
GM	24.5N	3	0400	..	..	..	..	--	-	11	111	53	06	04
JP	17.3N	3	0400	..	..	..	..	--	-	9	104	38	06	04
SH	14.6N	3	0400	..	..	..	..	--	-	7	137	41	06	04
UJ	13.5N	3	0400	..	..	..	..	--	-	8	118	38	06	04
AL	09.5N	3	0400	..	..	..	..	04(6,7,8) 05(1)	5	7	124	37	06	04
AN	01.5N	3	0400	..	..	..	..	--	-	5	194	125	06	04
TV	01.1S	3	0400	..	..	..	..	--	-	5	220	..	06	04
KG	56.5S	3	0855	SC*	--	--	--	03(7,8),4(1)	6	--	--	--	04	09
HD	07.6N	4	1500	..	..	..	..	05(1)	6	6	87	19	05	23
CO	64.6N	10	1306	SC*	-14	+70	-14	11(3)	6	173	1110	500	12	13
SI	60.0N	10	1306	SC*	-10.7*	+32.9	+13.3	11(3)	7	80	780	610	12	20
NE	55.1N	10	1305	SC	4	22	3	10(8) 11(3)	7	59	361	522	13	05
NI	54.2N	10	1307	SC*	- 4 *	+86 *		10(8) 11(1)	7	56	310	135	12	04
FR	49.6N	10	1306	SC	- 4	+14	- 6	10(8)	7	31	261	112	13	03
IR	41.0N	10	1256	SC*	-02	66	11	10(8)	6	28	225	53	12	12
SJ	29.9N	10	1306	SC	+3	+14	+4	10(8)	7	16	215	60	12	04
GM	24.5N	10	1306	SC	- .8	40	- 4	--	-	9	143	53	12	04
HO	21.1N	10	1306	SC	4	23	8	14(2)	7	5	127	27	15	17
JP	17.3N	10	1306	SC	- 1.2	38	-- 9	--	-	8	141	43	12	04
SH	14.6N	10	1306	SC	- .4	33	7	--	-	6	145	32	12	04
UJ	13.5N	10	1306	SC	- .8	45	-10	--	-	7	182	43	12	04
AL	09.5N	10	1306	SC	- 1.0	33	- 8	10(8)	6	6	141	42	12	04
HD	07.6N	10	1305	SC	- .5	+37	- 2	11(1)	7	5	168	48	12	22
GU	04.0N	10	1307	SC	--	29	- 8	11(1)	7	10	170	50	12	16
AN	01.5N	10	1306	SC	- 1.7	42	23	--	-	5	233	53	12	04
HU	00.6S	10	1307	SC*	3	97	7	11(6)	7	12	589	75	12	22
TV	01.1S	10	1306	SC	- .3	33	45	--	-	3	..	..	12	04
PH	18.7S	10	1306	SC	+00.3	+29	+25	10(8)	6	9	140	70	12	12
HR	33.7S	10	1307	SC	+2	+28	+16	10(8)	6	33	122	161	12	12
GN	43.3S	10	1306	SC	+ 2.1	+27	+13	10(8) 11(1)	6	21	160	100	12	12
TO	46.7S	10	1305	SC	+ .7	+33	- 6	10(8) 11(1)	5	26	190	47	12	03
KG	56.5S	10	1308	SC*	--	--	--	10(8)	8	--	--	--	11	10
CO	64.6N	13	08--	..	..	..	..	14(4)	7	264	1540	1120	15	16
SI	60.0N	13	08--	..	..	..	..	14(5)	8	150		850	15	16
NE	55.1N	13	19--	..	..	..	..	14(5)	7	55	280	413	16	07
NI	54.2N	13	18--	..	..	..	..	13(8) 14(7)	6	40	250	85	15	05
FR	49.6N	13	12--	..	..	..	..	13(7,8) 14(1,5)	5	23	133	134	16	03
IR	41.0N	13	0400	..	..	..	..	14(5)	6	16	146	84	15	18
SJ	29.9N	13	1926	SC	+1	+14	+4	13(8)	6	06	126	59	15	05
GM	24.5N	13	1100	..	..	..	..	--	-	8	184	50	14	23
JP	17.3N	13	1100	..	..	..	..	--	-	6	169	38	14	23
SH	14.6N	13	1100	..	..	..	..	--	-	5	192	31	14	23
UJ	13.5N	13	1100	..	..	..	..	--	-	4	166	38	14	23
AL	09.5N	13	1100	..	..	..	..	14(4)	6	5	164	34	14	23
HD	07.6N	13	1924	SC	- .4	+24	- 1	14(5)	7	4	198	23	15	16
AN	01.5N	13	1100	..	..	..	..	--	-	4	210	61	14	23
HU	00.6S	13	1215	..	..	..	..	14(5)	6	8	340	69	15	20
TV	01.1S	13	1100	..	..	..	..	--	-	3	234	114	14	23
PH	18.7S	13	1925	SC	0	+14	+13	13(8)	6	5	170	60	15	09
HR	33.7S	13	1800	..	..	..	..	13(7),14(1,7)	5	22	117	73	15	12
KG	56.5S	14	09--	..	..	..	..	14(5,7)	7	--	--	--	15	03
GU	04.0N	17	2345	SC*	--	27	- 7	18(2)	5	--	110	20	18	09
SI	60.0N	17	2346	SC*	+ 2.6*	+17.1*	+ 5.2*	19(3)	7	70	660	510	20	11
NE	55.1N	17	2345	SC*	3	31	1	19(3,5,7) 20(1,2)	5	28	155	258	21	10
FR	49.6N	17	2345	SC*	+ 2	+25	- 5	19(5,6,7)	5	18	110	57	22	00
HO	21.1N	17	2345	SC	4	17	5	11(2)	8	6	241	49	18	20
HD	07.6N	17	2344	SC	- .1	+15	- 1	18(2,6)	4	4	72	15	18	22
HR	33.7S	17	2348	SC	+2	+13	+9	19(3,7),20(1)	5	19	103	93	20	12
KG	56.5S	17	2347	SC*	--	--	--	18(1,2)	4	--	--	--	18	09

PRINCIPAL MAGNETIC STORMS

APRIL 1978

OBS. 2 letter IAGA code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(γ)	Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(γ)	Z(γ)	UT END DAY	HOUR
GM	24.5N	18	1700	..	..	..	..	--	-	11	73	67	21	02
JP	17.3N	18	1700	..	..	..	..	--	-	9	96	56	21	02
SH	14.6N	18	1700	..	..	..	..	--	-	7	107	52	21	02
UJ	13.5N	18	1700	..	..	..	..	--	-	8	122	56	21	02
AL	09.5N	18	1700	..	..	..	..	19(3,7)	5	7	122	48	21	02
AN	01.5N	18	1700	..	..	..	..	--	-	6	202	78	21	02
TV	01.1S	18	1700	..	..	..	..	--	-	5	233	..	21	02
KG	56.5S	18	1712	..	..	..	..	19(6,7,8),20(1)	5	--	--	--	20	01
CO	64.6N	19	04--	..	..	..	..	19(3)	7	155	1210	620	20	18
WI	54.2N	19	04--	..	..	..	..	19(7)	6	34	155	95	20	11
IR	41.0N	19	0300	..	..	..	..	19(3,5,7),20(4)	5	18	121	38	20	20
SJ	29.9N	19	0300	..	..	..	..	19(7)	5	08	84	26	20	11
HD	07.6N	19	0300	..	..	..	..	19(7)	5	7	144	29	20	17
GU	04.0N	19	0254	..	..	..	..	19(3)	5	--	120	20	20	17
HU	00.6S	19	0047	..	..	..	..	19(6,7)	6	6	289	41	20	22
PM	18.7S	19	03..		..	..	..	19(3,5)	6	6	110	50	20	12
GN	43.3S	19	03--	..	..	..	..	19(7)	6	19	70	110	20	19
TO	46.7S	19	04--	..	..	..	..	19(4,7)	5	21	128	64	20	11
HO	21.1N	19	0656	SC	4	20	8	20(1)	6	6	59	24	21	00
CO	64.6N	23	08--	..	..	..	..	23(6) 24(2,6)	6	225	1270	1020	24	19
SI	60.0N	23	09--	..	..	..	..	24(1)	7	70	640	410	28	10
NE	55.1N	23	14--	..	..	..	..	24(2)	6	36	177	245	29	02
WI	54.2N	23	14--	..	..	..	..	24(6)	6	25	220	105	25	04
FR	49.6N	23	14--	..	..	..	..	22(6) 23(1,2)	5	27	133	65	28	13
IR	41.0N	23	0600	..	..	..	..	23(6),24(1)	6	16	170	48	25	21
GM	24.5N	23	1400	..	..	..	..	--	-	8	95	31	25	03
JP	17.3N	23	1400	..	..	..	..	--	-	7	79	41	25	03
SH	14.6N	23	1400	..	..	..	..	--	-	6	84	40	25	03
UJ	13.5N	23	1400	..	..	..	..	--	-	7	95	40	25	03
AL	09.5N	23	1400	..	..	..	..	24(6)	5	7	69	42	25	03
HD	07.6N	23	1100	..	..	..	..	24(1,6)	5	6	127	32	26	22
GU	04.0N	23	2350	..	..	..	..	24(1)	5	10	130	40	25	13
HU	00.6S	23	1113	..	..	..	..	23(5,6)	5	8	381	48	24	22
TV	01.1S	23	1400	..	..	..	..	--	-	4	139	90	25	03
PM	18.7S	23	08..	..	..	..	..	24(1,2,3,4)	5	5	120	70	25	16
HR	33.7S	23	1400	..	..	..	..	24(2)	5	22	76	65	25	09
KG	56.5S	23	14--	..	..	..	..	24(1,6)	6	--	--	--	25	04
HR	33.7S	29	2000	..	..	..	..	30(6)	6	15	136	135	30	24
CO	64.6N	30	00--	..	..	..	..	02(3)	8	447	2290	2330	04	21
SI	60.0N	30	04--	..	..	..	..	04(5)	8	--	--	--	04	20
NE	55.1N	30	0953	SC	5	44	--	02(3)	9	129	1049	968	04	23
WI	54.2N	30	0952	SC*	+ 2 *	-25 *		30(6)	8	31	365	135	30	24
FR	49.6N	30	0952	SC	- 5	+36	- 7	--	-	--	--	--		
SJ	29.9N	30	0951	SC	-1	+21	+4	30(6)	6	12	118	43	01	16
GM	24.5N	30	0951	SC	- .5	28	- 2	--	-	10	148	29	01	02
HO	21.1N	30	0941	SC	4	28	11	30(2)	5	117	71	24		
JP	17.3N	30	0951	SC	- .9	28	- 5	--	-	8	144	29	01	02
SH	14.6N	30	0951	SC	- .4	24	5	--	-	7	133	20	01	02
UJ	13.5N	30	0951	SC	- .5	34	- 7	--	-	7	169	31	01	02
AL	09.5N	30	0951	SC	- .8	25	- 7	30(6)	6	7	151	34	01	02
HD	07.6N	30	0951	SC	- .4	+27	- 3	30(6)	6	6	173	16	01	02
GU	04.0N	30	0951	SC	--	27	- 9	30(4)	5	--	90	30	01	08
HU	00.6S	30	0951	SC	1	34	7	30(6)	8	10	564	62	30	23
TV	01.1S	30	0951	SC	.1	44	53	--	-	4	202	136	01	02
PM	18.7S	30	0951	SC	+00.3	+33	+28	30(4)	6	4	100	60	30	18
GN	43.3S	30	0951	SC*	+ 9 *	- 3.2*	-10	01(8)	8	40	160	220		
TO	46.7S	30	0950	SC -	3- 3.5	+40	- 9	01(8)	7	56	300	122	03	15
KG	56.5S	30	0951	SC*	--	--	--	30(6)	7	--	--	--	01	07
IR	41.0N	30	0951	SC*	26	23	03	30(6),1(5,8),2(3,4)	7	33	296	176	02	20

Reports were received from the following observatories:

Alibag Annamalainagar College Fredericksburg Gnangara Guam Gulmarg Hermanus Honolulu Huancayo Hyderabad Irkutsk Jaipur Kerguelen Newport Port Moresby San Juan Shillong Sitka Toolangi Trivandrum Ujjain Witteveen

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

APRIL 1978

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romaná)

The meaning of the station symbols is given in the IAGA-News No. 16.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc).

10 1306 A: SOD NUR WNG WIT ESK DOU VIC FUR CLF OTT MMB EBR COI TOL FRD KAK KNY SZT LMN LAS TRW CZT PAF
B: NGK HAD HUA GNA DRV

17 2345 A: SOD NUR ESK DOU VIC TOL FRD SZT LMN LAS TRW PAF
B: WNG WIT HAD CLF EBR KSA CZT
C: NGK DRV (si: A: FUR OTT HUA)

30 0951 A: SOD NUR ESK FUR COI TOL FRD SZT HUA LMN LAS TRW CZT PAF DRV
B: WNG WIT HAD VIC OTT MMB KAK KSA KNY GNA
C: NGK CLF EBR

Solar-flare effects (sfe).
Effects confirmed by ionospheric or solar observations are underlined.

08 1121 - 1128 WNG

09 0421 - 0440 MMB KAK KNY (bs: A: TRW - bps: A: HUA)

09 1225 - 1305 WNG

09 2054 - 2108 HUA

10 1054 - 1125 SOD WNG WIT NGK CLF EBR LAS

12 1733 - 1743 HUA

17 0646 - 1657 GNA

28 1314 - 1451 NGK EBR (bp: B: TOL LMN)

Very unusual events.

04 1958 b-bp CZT (+177 +196 +114) PAF (-430 -738 +392)

18 1721 si FUR (+20 -3) LAS (-29 -20 -12)

19-20 1850-0545 pc3 MMB (14s +2.20 -0.65 -0.19 nT/s)

20 0855-1100 pc3+4 DOU FUR (25-55s +0.5 +1) LAS

23 1459 bp GNA DRV (+172 -143 -208)

RADIO PROPAGATION QUALITY INDICES

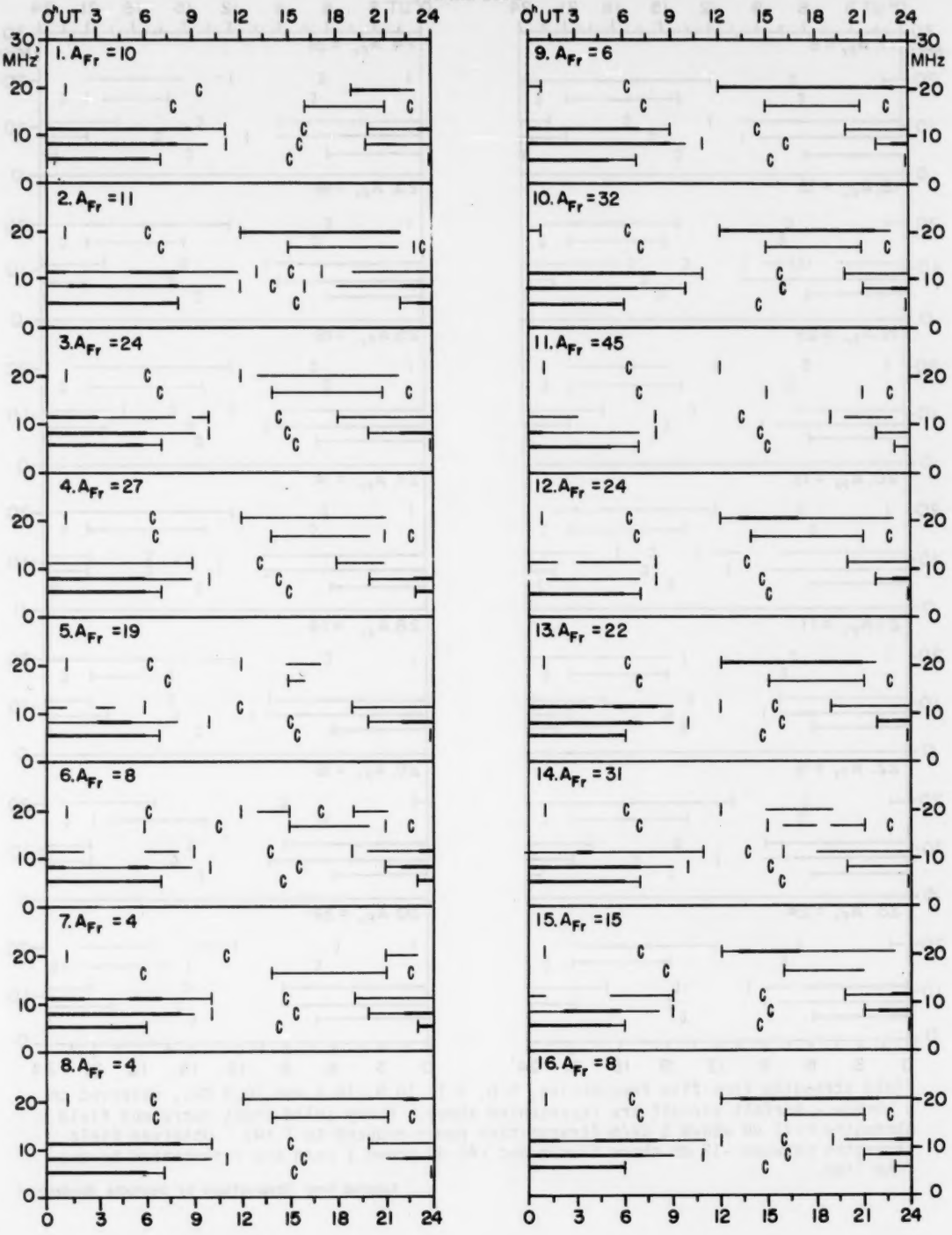
APRIL 1978

Quality indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	4.9	5.7	12.6	5.1	12.4
2	6.1	6.4	12.5	3.9	12.3
3	4.9	3.8	12.7	3.9	12.3
4	3.5	4.0	12.6	3.2	11.8
5	3.0	3.9	11.9	2.8	11.9
6	6.7	4.7	12.4	3.7	12.6
7	6.9	4.8	13.3	5.1	13.0
8	6.3	4.9	12.2	4.7	12.6
9	7.1	6.4	12.8	5.2	12.9
10	5.3	5.5	12.7	4.3	12.3
11	3.3	3.9	11.3	4.6	10.9
12	5.3	4.4	13.2	6.5	13.4
13	5.6	5.2	11.8	5.8	13.2
14	4.1	3.5	12.2	5.2	12.0
15	6.0	4.9	12.3	6.8	13.5
16	5.1	5.4	12.8	7.3	13.5
17	6.3	5.6	13.2	6.1	13.9
18	4.7	4.6	12.3	6.3	12.9
19	4.2	4.1	12.6	4.8	13.8
20	4.7	4.1	11.9	5.9	12.2
21	5.9	4.5	12.9	7.1	13.8
22	6.3	6.1	12.4	6.6	13.7
23	4.4	4.4	12.2	5.3	12.2
24	3.9	4.2	11.8	5.9	12.2
25	6.0	5.4	13.5	5.1	12.2
26	5.6	5.5	13.6	6.2	13.5
27	6.5	6.2	13.0	5.5	12.6
28	5.1	5.4	11.5	6.0	12.4
29	5.5	5.4	12.1	6.1	13.4
30	3.6	3.8	10.6	5.6	12.1
MEAN	5.2	4.9	12.4	5.4	12.7

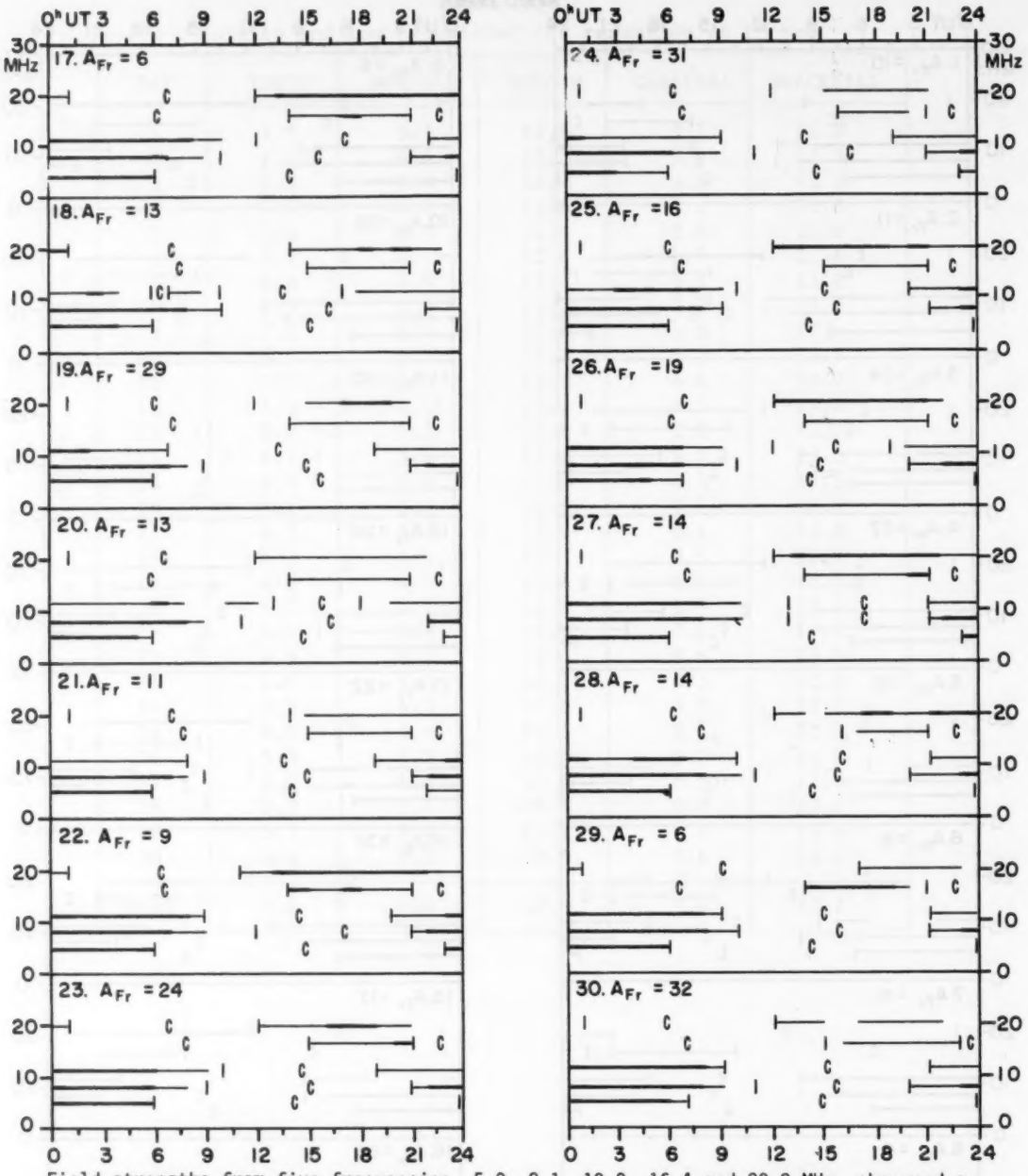
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

APRIL 1978



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

APRIL 1978



Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow - Norfolk circuit are represented above. Heavy solid lines represent field strengths ≥-12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line.

Adapted from Observations by Deutsche Bundespost

USCOMM-NOAA-ASHEVILLE, NC--7-78--950

JUNE 1978 Number 406 - Part II

JUL 24 1978

Solar-Geophysical Data comprehensive reports

Data for December 1977 -- November 1977 & Miscellanea
Explanation of Data Reports Issued as Number 402 (Supplement) February 1978

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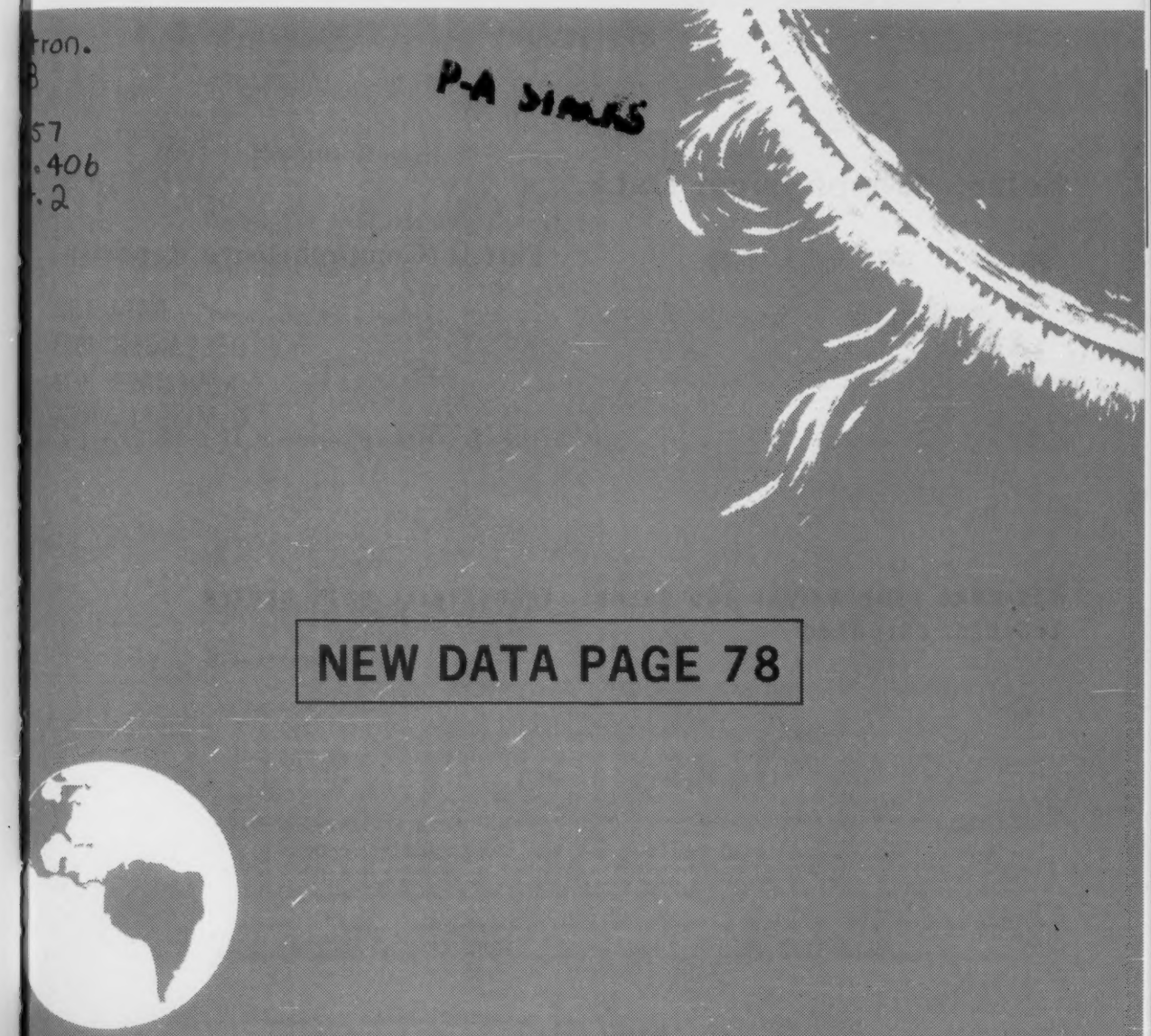
P-A SIMMS



NEW DATA PAGE 78

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / BOULDER, COLORADO

U.S. DEPARTMENT OF COMMERCE
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Richard A. Frank, Administrator
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Solar - Geophysical Data

NO. 406 JUNE 1978

Part II (Comprehensive Reports)

DATA FOR
DECEMBER 1977
NOVEMBER 1977
& MISCELLANEA

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
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To standardize referencing these reports in the open literature, the following format is recommended:

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SOLAR-GEOPHYSICAL DATA

No. 406

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar-Terrestrial Data Services Division

CONTENTS

PAGE

Part I (Prompt Reports)

Index for 1977 and 1978 2

Data for May 1978 3-50

Data for April 1978 51-172

Part II (Comprehensive Reports)

Index for 1977 and 1978 2

Data for December 1977 3-47

Data for November 1977 49-59

Miscellaneous Data 61-84

Solar Radio Waves
Selected Events by Radioheliograph, March 1978
Spectral Observations Culgoora, March 1978,
" " Manila, January 1978

Geomagnetic Indices
Sudden Commencements and Solar Flare Effects,
March 1978

Cosmic Rays
Neutron Monitor Daily Values and Chart of Variations
Climax, December 1977 - March 1978

Energetic Solar Particles
GMS/SEM Data for September 1977 Event

INDEX FOR 1977 AND 1978 DATA PUBLISHED IN "SOLAR-GEOPHYSICAL DATA"

		1977 Aug	Sep	Oct	Nov	Dec	1978 Jan	Feb	Mar	Apr	May
A.	SOLAR AND INTERPLANETARY PHENOMENA										
A.1	Sunspot Drawings	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.2a	Zurich Provisional Relative Sunspot Numbers Rz	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.2b	Zurich Final Sunspot Numbers Rz	404A 7	404A 8	404A 8	404A 8	404A 8					
A.2c	American Relative Sunspot Numbers RA'	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.3a	Mt. Wilson Magnetograms	898A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.3b	Mt. Wilson Magnetic Characteristics of Sunspots	398A 98	399A 94	400A 92	401A 96	402A100	403A108	404A 96	405A110	406A114	
A.3c	Kitt Peak Magnetograms	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.3d	Mean Solar Magnetic Field (Stanford)	397A 25	398A 29	399A 29	400A 24	401A 31	402A 33	404A 33	404A 33	405A 36	406A 40
A.4	H-alpha Filtergrams	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.5	Calcium Plage Drawings - McMath (or Catania)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.5a	Calcium Plage (McMath) and Sunspot Regions	398A 98	399A 94	400A 92	401A 96	402A100	403A108	404A 96	405A110	406A114	
A.5b	McMath Daily Calcium Plage Indices	398A105	399A 99	400A 99	401A100	402A105	403A114	404A104	405A119	406A124	
A.6	H-alpha Synoptic Charts	398A 34	399A 32	400A 28	401A 35	402A 36	403A 44	404A 38	405A 46	406A 52	
A.6b	Synoptic Chart and Active Regions (Paris)	402B 4	403B 4	404B 4	405B 4	406B 4					
A.7f	Helium D3 Chromosphere (Big Bear)	397A 19	398A 24	399A 24	400A 21	401A 28	402A 29	403A 36	404A 29	405A 31	406A 35
A.7g	Helium Synoptic Maps (KPNO)	397A 20	398A 22	399A 23	400A 20	401A 27	402A 28	403A 35	404A 27	405A 32	406A 36
A.7h	Coronal Line Emission (Sac Peak)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.8aa	2800 MHz - Daily Values of Solar Flux (ARO-Ottawa)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.8ac	2800 MHz - Daily Values of Adj. Solar Flux (ARO-Ottawa)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.8g	Daily Values of Adjusted Solar Flux (AFGL)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9
A.9cb	8.6 mm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 57	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.9d	2 cm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 52	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	
A.10a	169 MHz - Interferometric Observations (Nancay)	397A 13	398A 14	399A 14	400A 12	401A 15	402A 16	403A 20	404A 17	405A 17	406A 19
A.10c	21 cm East-West Solar Scans (Fleurs)	397A 15	398A 16	399A 16	400A 14	401A 17	402A 19	403A 23	404A 20	405A 20	406A 22
A.10d	43 cm East-West Solar Scans (Fleurs)	397A 16	398A 17	399A 17	400A 15	401A 18	402A 20	403A 24	404A 21	405A 21	406A 23
A.10e	10.7 cm East-West Solar Scans (Ottawa-ARO)	397A 14	398A 15	399A 15	400A 13	401A 16	402A 18	403A 22	404A 19	405A 19	406A 21
A.10f	3 cm East-West Solar Scans (Toyokawa)					403B 68	402A 17	403A 21	404A 18	405A 18	406A 20
A.11k	Solar X-ray Radiation (SOLRAD 11)						403A116	404A108	405A122	406A129	
A.11g	Solar X-ray (SMS/GOES)	---	398A 25	399A 20	400A 17	401A 22	402A 24	403A 29	404A 24	405A 29	406A 30
A.11h	Solar X-ray (OSO-8; 1975-057A)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	
A.11i	Solar X-ray (Columbia U.)	404B 65	404B 68	404B 40							
A.12ba	Cosmic Ray Protons (Pioneers 6 & 7)	397A 23	---	399A 26	---	---	402A 30	---	---	---	---
A.12bb	Cosmic Ray Protons (Pioneers 8 & 9)	---	---	399A 27	---	---	402A 31	---	---	---	---
A.12e	Energetic Solar Particles (IMP H & J)	402B 24	403B 37	404B 35	405B 22	406B 43					
A.12f	Energetic Solar Particles (GMS/SEM)	---	406B 78	---	---	---	---	---	---	---	406A 44
A.13a	Solar Wind (Pioneers 6 & 7)	397A 23	---	399A 26	---	---	402A 30	---	---	---	---
A.13ab	Solar Wind (Pioneers 8 & 9)	---	---	399A 27	---	---	402A 31	---	---	---	---
A.13d	Solar Wind from IPS Measurements	397A 27	398A 27	399A 25	400A 25	401A 29	402A 34	403A 37	404A 31	405A 37	406A 41
A.13e	Solar Plasma (IMP H & J)	402B 23	403B 22	404B 34							
A.17	Interplanetary Magnetic Field (Pioneer 8)	---	---	---	---	---	---	---	---	---	---
A.17	Interplanetary Magnetic Field (Pioneer 9)	---	---	---	---	---	402A 31	---	---	---	---
A.17c	Inferred IP Magnetic Field	397A 24	398A 28	400A 22	400A 22	401A 30	402A 32	403A 38	404A 32	406A 38	406A 38
A.18	Interplanetary Electric Field (Pioneer 8)	---	---	399A 27	---	---	---	---	---	---	---
A.18	Interplanetary Electric Field (Pioneer 9)	---	---	---	---	---	402A 31	---	---	---	---
B.	IONOSPHERIC (AND RADIO WAVE PROPAGATION) PHENOMENA										
B.52	Graphs of Transmission Frequency Range	398A124	399A128	400A120	401A116	402A132	403A148	404A144	405A158	406A171	
B.53	Quality Figures Based on Frequency Ranges	398A126	399A127	400A122	401A118	402A131	403A150	404A146	405A157	406A170	
C.	FLARE-ASSOCIATED EVENTS										
C.1a	Optical Observations Flares	397A 10	398A 10	399A 10	400A 10	401A 10	402A 12	403A 12	404A 12	405A 12	406A 12
C.1ba	Optical Observations Flares (Standardized Data)	402B 8	403B 8	404B 8	405B 8	406B 8					
C.1d	Flare Patrol Observations	397A 12	398A 13	399A 13	400A 11	401A 14	402A 15	403A 19	404A 16	405A 16	406A 18
C.1d	Flare Patrol Observations	402B 17	403B 21	404B 22	405B 16	406B 25					
C.1e	Flare Indices (by day)	402B 16	403B 20	404B 21	405B 15	406B 24					
C.1f	Flare Indices (by Region)	403B 53	404B 53	405B 38	406B 59						
C.3	Solar Radio Waves - Outstanding Occurrences	402B 18	403B 22	404B 23	405B 17	406B 26					
	Solar Radio Waves - Fixed Frequencies - Selected	397A 17	398A 18	399A 18	400A 16	401A 19	402A 21	403A 25	404A 22	405A 22	406A 24
C.3t	43.25, 80 and 160 MHz Selected Bursts (Culgoora)	399B 36	399A113	401B 44	403B 64	403B 65	405B 45	405B 48	406B 62		
C.4a	Solar Radio Spectral Obs. (Fort Davis)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4d	Solar Radio Spectral Obs. (Culgoora)	400B 62	399A102	401B 38	403B 56	403B 59	404B 56	405B 40	406B 64		
C.4e	Solar Radio Spectral Obs. (Weissenau)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4f	Solar Radio Spectral Obs. (Sagamore Hill)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4h	Solar Radio Spectral Obs. (Dwingeloo)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	---	
C.4i	Solar Radio Spectral Obs. (Durnten)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	
C.4j	Solar Radio Spectral Obs. (Manila)		399A102	400A101	401A102	402A108	406B 70	404A122	405A138	406A144	
C.5e	Solar X-ray (SMS/GOES)	397A 22	399B 37	399A 22	400A 19	401A 24	402A 26	403A 29	404A 26	---	406A 32
C.5f	Solar X-ray (Columbia U.)										
C.6	Sudden Ionospheric Disturbances	398A106	399A100	400A100	401A101	402A106	403A115	404A105	405A120	406A125	
D.	GEOMAGNETIC AND MAGNETOSPHERIC PHENOMENA										
D.1a	Geomagnetic Indices Kp, Kn, Ks, Km, Ap, aa, Cp	398A117	399A120	400A113	401A109	402A125	403A142	404A139	405A151	406A162	
D.1ba	27-day Chart of Kp Indices	398A119	399A122	400A115	401A111	402A127	403A144	404A141	405A153	406A164	
D.1c	27-day Chart of C9	404A142	404A142	404A142	404A142	404A142					
D.1d	Principal Magnetic Storms	398A122	399A125	400A118	401A114	402A130	403A145	404A143	405A156	406A167	
D.1e	Reduced Magnetograms								405A 39		
D.1f	Sudden Commencement and Solar Flare Effects	398A123	399A126	400A119	401A115	403B 69	403A147	405B 55	406B 72	406A169	
D.1g	Equatorial Indices Dst	398A121	399A124	400A117	401A113	402A129	405B 53	405B 54	405A155	406A166	
F.	COSMIC RAYS										
F.1a	Cosmic Ray Neutron Counts (Deep River)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150		
F.1b	Cosmic Ray Neutron Counts (Climax)	398A116	399A115	400A112	401A108	406B 73	406B 73	406B 73	406B 73	406A161	
F.1e	Cosmic Ray Neutron Counts (Alert)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150		
F.1f	Cosmic Ray Neutron Counts (Calgary)	400B 70	400B 70	402B 47							
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	400B 70	---	402B 47							
F.1h	Cosmic Ray Neutron Counts (Thule)										
F.1i	Cosmic Ray Neutron Counts (Kiel)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	
F.1k	Cosmic Ray Neutron Counts (Kula)	398A116									
H.	MISCELLANEOUS										
H.60	IUWDS Alert Decisions	397A 4	398A 4	399A 4	400A 4	401A 4	402A 5	403A 5	404A 4	405A 4	406A 4
H.62	Abbreviated Calendar Record	403B 46	404B 46	405B 30	406B 52						

Notes:

"398A 36" listed under 1977 Aug means that data for August 1977 were contained in *Solar-Geophysical Data* Number 398 - Part I, beginning on page 36.

A = Part I, B = Part II.

----- = no data available.
Blank = data not yet received.

DECEMBER 1977 DATA

Contents

	Page
Active Regions	4-5
Synoptic Solar Maps	6-7
Solar Flares	
Hα Solar Flares (Standardized Data)	8-23
Daily Flare Indices	24
No-Flare-Patrol Chart	25
Solar Radio Waves	
Worldwide Outstanding Occurrences at Fixed Frequencies	26-42
Energetic Solar Particles and Plasma (IMP 7 and 8 Solar Wind Plasma data not available at time of publication)	43-47
Solar X-ray Radiation (Data not available at time of publication)	
Magnetograms of Geomagnetic Storm (Data not available at time of publication)	

ACTIVE REGIONS

CARRINGTON ROTATION 1662

(November 24 - December 21, 1977)

Region No.	Coordinates		Age at CMP	Imp.	Spot-less Region	Region No. in Rotation 1661	Activity at West Limb
	Lat.	Long.					
1	35°N	318°	>6	1	x		dispersed
2	34 N	312	>6	1	x		dispersed
3	15 N	285	0	2			increasing
4	3 N	252	+4	1	x		disappeared
5	20 N	252	>6	1	x	(11)	decreasing
6	13 N	251	-2	2			stable
7	17 S	227	-3	1	x		stable
8	17 N	226	0	2			decreasing
9	8 N	221	>6	1	x	(13)	decreasing
10	19 N	213	>6	1	x	(14)	dispersed
11	10 N	206	>6	1	x	(15)	decreasing
12	19 S	202	>6	4			decreasing
13	24 S	189	>6	2			decreasing
14	18 N	187	+6	1	x		dispersed
15	28 N	168	>6	1	x		dispersed
16	2 N	160	-1	1	x		dispersed
17	25 N	155	>6	1	x	(17)	dispersed
18	25 S	143	>6	1	x	(19)	disappeared
19	25 S	134	>6	5			decreasing
20	23 N	109	-5	1	x		(?)
21	24 N	89	+6	3			decreasing
22	23 S	84	+2	1	x		disappeared
23	22 S	69	>6	1	x		dispersed
24	28 S	61	>6	1	x		decreasing
25	24 S	60	+1	2			decreasing
26	25 N	56	>6	1	x	(30)	dispersed
27	37 N	53	>6	1	x		dispersed
28	16 N	45	>6	2			decreasing
29	16 N	34	>6	1	x	(36+37)	decreasing
30	13 S	23	+3	1	x		dispersed
31	20 N	17	0	1	x		disappeared

ACTIVE REGIONS

CARRINGTON ROTATION 1663

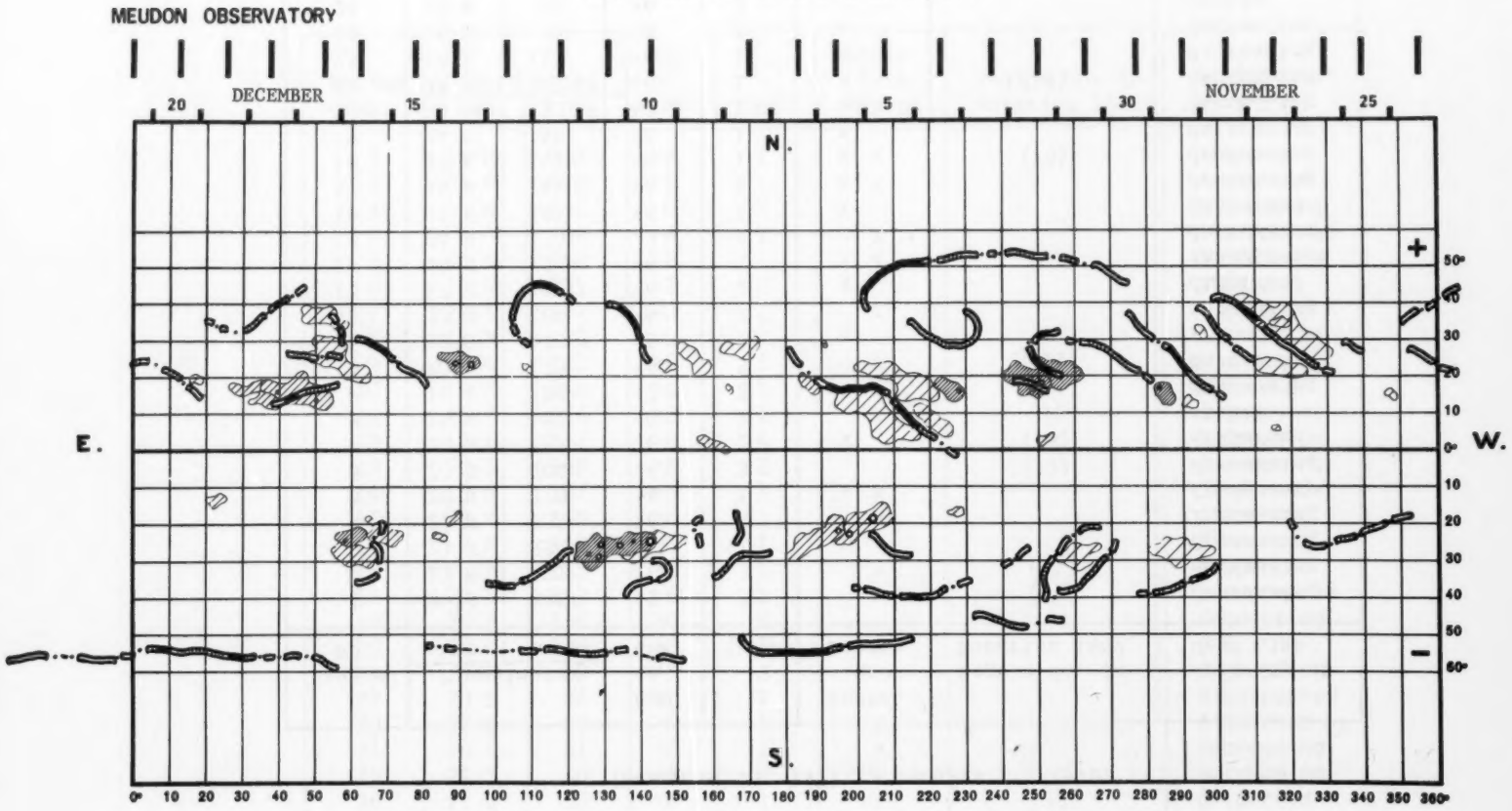
(December 21, 1977 to January 17, 1978)

Region No.	Coordinates Lat.	Coordinates Long.	Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1662	Activity at West Limb
1	29°S	356°	+2	3			decreasing
2	23 N	321	>6	3			decreasing
3	23 N	252	0	1	x		decreasing
4	22 N	235	>6	5			increasing
5	24 N	220	+4	1	x		disappeared
6	20 S	204	>6	3		(12)	decreasing
7	23 S	185	>6	1	x	(13)	dispersed
8	16 N	182	0	2			stable
9	16 S	180	-2	2			decreasing
10	20 S	175	>6	3			decreasing
11	32 S	175	-5	1	x		(?)
12	37 N	164	>6	2			decreasing
13	17 N	157	>6	1	x		dispersed
14	30 N	155	>6	1	x		disappeared
15	34 N	155	-3	1	x		decreasing
16	27 N	145	>6	1	x		dispersed
17	19 N	144	>6	1	x		decreasing
18	27 S	141	>6	1	x	(18)	decreasing
19	24 N	140	>6	1	x		decreasing
20	24 S	117	+3	1	x		decreasing
21	28 S	117	>6	1	x	(19)	decreasing
22	16 N	115	>6	1	x		decreasing
23	26 S	77	-2	1	x		decreasing
24	20 N	67	>6	3			stable
25	21 S	66	-1	1	x		decreasing
26	21 N	57	>6	1	x	(26)	dispersed
27	7 N	45	>6	1	x	(28)	decreasing

SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1662

NOVEMBER 24 TO DECEMBER 21, 1977

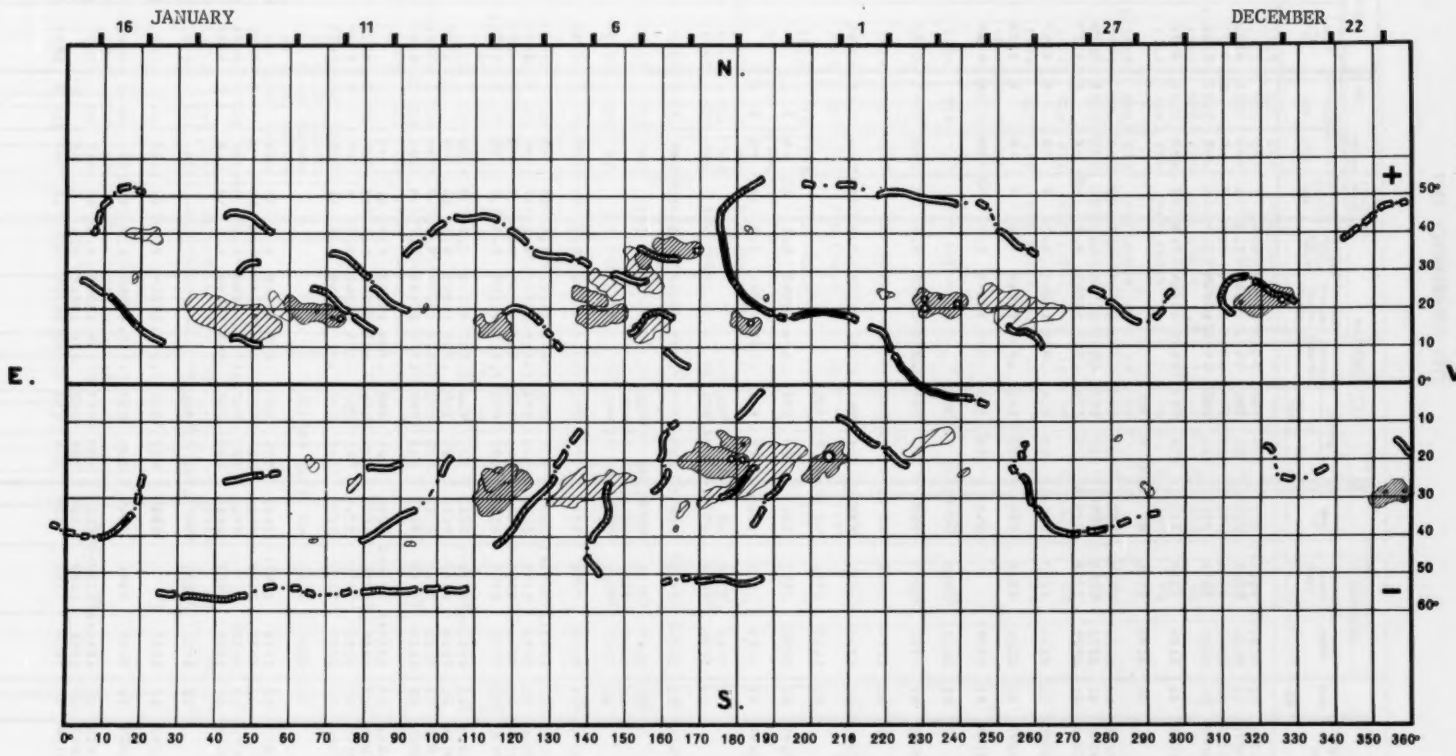


SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1663

DECEMBER 21 TO JANUARY 17, 1978

MEUDON OBSERVATORY



7
Dec 77

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
					APPROX		CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY			COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
	DATE DEC	START	MAX. PHASE	END	LAT.	MER. DIST.				MIN.							
GRP65082	01	0004+1	0006+0	0011	S21	E66	.927	15049	6.0	7	-N				50		D
MITK	01	0004	0006	0010	S21	E65	.921	15049	5.9	6	-N		C	0006	50		D
CULG	01	0005	0006	0012	S23	E74	.969	15049	6.6	7	-F		C	0006	20		
VORO	01	0005	0006	0011	S20	E66	.926	15049	6.0	6	-B		C	0006	72	1.8	
83 VORO	01	0104	0110	0116	N18	E17	.405	15044	2.3	12	-N		C	0110	90	1.0	GJ Y5
	01	0132	0135	NO FLARE PATROL													
GRP65084	01	0223+5	0228+1	0235	S22	E70	.950	15049	6.3	12	-N				30		V
VORO	01	0223	0229	0235	S22	E67	.934	15049	6.1	12	-B		C	0229	36	1.9	
CULG	01	0228	0228	0232D	S23	E74	.969	15049	6.7	4D	-F		P	0229	20		V
85 VORO	01	0253	0257	0300	S19	E61	.891	15049	5.7	7	-B		C	0257	54	1.3	E Y5
86 VORO	01	0325	0328	0334	S20	E61	.893	15049	5.7	9	-B		C	0328	27	.6	D Y5
87 MITK	01	0425E		0434	S20	E63	.907	15049	5.9	9D	-B		P	0426	50	1.2	EH Y5
	01	0613	0620	NO FLARE PATROL													
88 MONT	01	1002	1004	1007	S21	E59	.880	15049	5.8	5	-N		C	1004	40		D Y5
	01	1024	1036	NO FLARE PATROL													
89 ZURI	01	1323	1331	1333D	S21	E56	.856	15049	5.8	10D	-N		P	1331	70	1.5	Y5
	01	1433	1514	NO FLARE PATROL													
90 RAMY	01	1555E	1557	1601	S20	E58	.870	15049	6.0	6D	-N	3	C		48		H Y5
91 RAMY	01	1620	1622	1630	N22	E15	.433	15044	2.8	10	-N	3	C		63		F R Y5
	01	1706	1745	NO FLARE PATROL													
	01	1751	2016	NO FLARE PATROL													
92 PALE	01	2016E	2016U	2027D	S18	E57	.858	15049	6.1	11D	-F	3	C		69		DE H Y5
	01	2127	2134	NO FLARE PATROL													
	01	2148	2209	NO FLARE PATROL													
	01	2217	2325	NO FLARE PATROL													
93 VORO	01	2348	2352	0001	S20	E51	.810	15049	5.8	13	-B		C	2352	63	1.1	EL Y5
GRP65094	02	0053+3	0058+1	0103	S21	E51	.813	15049	5.9	10	-B				60	1.0	DHJ
CULG	02	0053	0058	0110	S23	E51	.819	15049	5.9	17	-N		C	0058	40	.8	J
MITK	02	0053	0058	0102	S21	E51	.813	15049	5.9	9	-B		C	0058	50	.9	DH
VORO	02	0056	0059	0103	S20	E51	.810	15049	5.9	7	-B		C	0059	90	1.6	J
GRP65095	02	0114+4	0118+1	0123	S20	E49	.791	15049	5.7	9	-N				50	.8	E
MITK	02	0114	0119	0130	S20	E49	.791	15049	5.7	16	-N		C	0119	50	.8	E
CULG	02	0116	0118	0123	S23	E51	.819	15049	5.9	7	-N		C	0118	40	.7	
VORO	02	0118	0119	0122	S19	E48	.778	15049	5.7	4	-B		C	0119	72	1.2	E
GRP65096	02	0235+3	0239+0	0246	S21	E50	.804	15049	5.9	11	-N				60	1.0	DHJL
CULG	02	0235	0239	0246	S23	E51	.819	15049	5.9	11	-F		C	0239	40	.7	
MITK	02	0236	0239	0244	S21	E50	.804	15049	5.9	8	-F		C	0239	50	.9	DH
VORO	02	0238	0239	0249	S20	E50	.801	15049	5.9	11	-B		C	0239	81	1.4	JL
	02	0525	0529	NO FLARE PATROL													
GRP65097	02	0534	0553+7	0606	S24	E55	.855	15049	6.4	32	-N				80	1.5	DHJ
CULG	02	0534	0600	0620	S25	E55	.858	15049	6.4	46	-N		C	0600	90	1.8	TFJ
MITK	02	0537E		0543	S22	E47	.779	15049	5.8	6D	-F		P	0538	60	1.0	DH
MITK	02	0548	0553	0606	S23	E55	.853	15049	6.4	18	-B		C	0553	70	1.4	D
	02	0758	0800	NO FLARE PATROL													
98 KANZ	02	0823		0849	N17	E03	.234	15044	2.6	21	-F						G Y5
99 HTPR	02	0935	0940	0945	S24	E55	.855	15049	6.5	10	-F		C	0940	30		E Y5
GRP65100	02	1056+0	1102+0	1107	S23	E53	.836	15049	6.4	11	-F						E
KANZ	02	1056	1102	1105	S23	E52	.828	15049	6.4	9	-F						
HTPR	02	1056	1102	1109	S24	E54	.847	15049	6.5	13	-F		C	1102	30		E

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
					APPROX		CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY								
	DATE DEC	START	MAX. PHASE	END	LAT.	MER. DIST.				MIN.		CONF	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
GRP65101	02	1109+0	1112+0	1115	S21	E43	.735	15049	5.7	6	-F						
KANZ	02	1109	1112	1115	S21	E43	.735	15049	5.7	6	-F						
HTPR	02	1109	1112	1114	S22	E44	.750	15049	5.8	5	-F		C	1112	10		
GRP65102	02	1139+1	1142+1	1147	S22	E54	.842	15049	6.5	8	-N				35	.7	D
MONT	02	1139	1142	1147	S22	E59	.881	15049	6.9	8	-F		C	1142	20		D
KANZ	02	1139E	1143	1154	S22	E52	.825	15049	6.4	15D	-N						
HTPR	02	1140	1143	1147	S24	E54	.847	15049	6.5	7	-N		C	1143	50		
GRP65103	02	1355	1358+1	1410	S21	E53	.831	15049	6.6	15	-F						
HTPR	02	1355	1358	1402	S24	E53	.839	15049	6.6	7	-F		C	1358	20		
HTPR	02	1356	1359	1410	S19	E54	.834	15049	6.6	14	-F		C	1359	20		
104 HTPR	02	1412	1418	1422	S24	E51	.822	15049	6.4	10	-F		C	1418	60		Y5
105 HTPR	02	1428	1431	1439	S27	E55	.863	15049	6.7	11	-F		C	1431	20		Y5
	02	1508	2131	NO FLARE PATROL													
	02	2145	2358	NO FLARE PATROL													
106 HTPR	03	1057	1058	1104	S18	E37	.655	15049	6.2	7	-F		C	1058	20		Y5
107 HTPR	03	1325	1330	1336	N09	W05	.169		3.2	11	-F		C	1330	10		Y5
GRP65108	03	1434	1440 1453	1510	N17	E47	.755	15053	7.1	36	-N						EGK
HTPR	03	1434	1440	1510	N17	E47	.755	15053	7.1	36	-N		C	1453	40		EGK
HTPR	03	1434	1453	1510	N17	E47	.755	15053	7.1	36	-N		C	1453			
109 HCMA	03	1806	1807	1826	S19	E33	.614	15049	6.2	20	-F		C	1807	40		E Y5
	03	2048	2340	NO FLARE PATROL													
GRP65110	04	0133+5	0141+3	0148	N12	W61	.879	15051	29.5	15	-F				60	1.3	
PALE	04	0133	0144	01460	N12	W60	.871	15051	29.6	13D	-F	3	V		45		DE F
MITK	04	0138	0141	0148	N13	W62	.888	15051	29.4	10	-N		C	0141	70	1.4	
111 MITK	04	0150	0153	0205	N14	W62	.889	15051	29.4	15	-N		C	0153	70	1.5	D Y5
112 MITK	04	0608	0614	0622	N13	W65	.910	15051	29.4	14	-N		C	0614	60		D Y5
113 HTPR	04	0801E		0833	N15	W65	.912	15051	29.5	32D	-F		C	0826	20		Y5
GRP65114	04	1011+1	1015 1023	1031	S21	E23	.517	15049	6.1	20	-F						E
HTPR	04	1011	1015	1030	S22	E23	.527	15049	6.1	19	-F		C	1015	20		E
KANZ	04	1012	1023	1031	S21	E23	.517	15049	6.2	19	-F						
GRP65115	04	1121+1	1123+0	1130	S06	E17	.312		5.7	9	-F						EG
KANZ	04	1121	1123	1130	S06	E17	.312		5.7	9	-F						G
HTPR	04	1122	1123	1130	S07	E17	.318		5.7	8	-F		C	1123	30		E
GRP65116	04	1351+0	1355+2	1406	S23	E26	.567	15049	6.5	15	-N						D
HTPR	04	1351	1357	14060	S24	E26	.576	15049	6.5	15D	-N		C	1357	30		
KANZ	04	1351	1355	1405	S23	E26	.567	15049	6.5	14	-N						D
117 HCMA	04	1625	1627	1633	S07	E14	.273		5.7	8	-N		C	1627	40		D Y5
	04	1730	1745	NO FLARE PATROL													
	04	1747	1758	NO FLARE PATROL													
	04	1902	1944	NO FLARE PATROL													
	04	2017	2052	NO FLARE PATROL													
	04	2125	2235	NO FLARE PATROL													
GRP65118	05	0043+4	0049 0058	0114	S18	E15	.400	15049	6.2	31	-N						L
CULG	05	0043	0058	0112	S19	E15	.412	15049	6.2	29	-F		C	0058	80	.9	F
VORO	05	0047	0049	0115	S18	E16	.410	15049	6.2	28	-B		C	0049	99	1.1	EL
119 CULG	05	0258	0300	0305	S19	E10	.370	15049	5.9	7	-F		C	0300	20	.2	T Y5
GRP65120	05	0914+1	0920+2	0931	S24	E81	.990	15056	11.5	17	-F						
KANZ	05	0914	0920	0932	S25	E76	.976	15056	11.1	18	-N						
HTPR	05	0915	0922	0929	S24	E86	.998	15056	11.8	14	-F		C	0918	20		
121 KANZ	05	1015	1020	1031	N16	W78	.979	15051	29.6	16	-N						Y5

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
122 KANZ	05	1213	1219	1233	S18	E05	.326	15049	5.9	20	-N						D	YS
GRP65123	05	1223+2	1224+4	1234	N17	W16	.389	15057	4.3	11	-F				50	.5	E	
HTPR	05	1223	1224	1230	N18	W17	.411	15057	4.2	7	-F		C	1224	40		E	
MONT	05	1225	1228	1238	N17	W16	.389	15057	4.3	13	-N		C	1228	60		E	
124 RAMY	05	1507E	1508U	1514	S18	E06	.331	15049	6.1	7D	-F	3	C		127		F	YS
125 RAMY	05	1558E	1601	1609	S24	E78	.982	15056	11.5	11D	-F	3	C				DE	YS
126 RAMY	05	1640E	1642	1648D	S16	E01	.283	15049	5.8	8D	-N	3	C		95		DE	YS
GRP65127	05	1805+0	1810+0	1827	S20	E09	.378	15049	6.4	22	-F				40	.4	U	
PALE	05	1805	1810	1827	S20	E14	.416	15049	6.8	22	-F	3	C		39		F U	
PALE	05	1805	1810	1827	S20	E04	.355	15049	6.1	22	-F	3	V		39		FDE	
	05	1924	1931	NO FLARE PATROL														
GRP65128	05	1946+0	1948+0	1958	N17	W48	.767	15044	2.2	12	-F				20	.3		
PALE	05	1946	1948	1958	N17	W48	.767	15044	2.2	12	-F	3	C		18		DE	
PALE	05	1946	1948	1958	N17	W48	.767	15044	2.2	12	-F	3	V		18		DE	
	05	2031	2239	NO FLARE PATROL														
GRP65129	05	2211	2219 2312	2335	S18	00	.316	15049	5.9	84	-N						F	
CULG	05	2211	2219	2335	S18	E03	.320	15049	6.1	84	-F		C	2219	50	.5	FT	
CULG	05	2306	2312	2320	S18	W04	.323	15049	5.7	14	-N	*	C	2312	35	.4		
130 CULG	05	2225	2306	0000	S27	E60	.897	15056	10.4	95	-N		C	2306	80	1.8	SU	YS
GRP65131	05	2314	2317 2325	2333	S26	E74	.970	15056	11.5	19	-N							
CULG	05	2314	2317	2333	S27	E70	.953	15056	11.2	19	-N		C	2317	20			
MANI	05	2322E	2325U	2329D	S26	E78	.983	15056	11.8	7D	-F	3	V		25	.6		
132 PALE	06	0110E	0113	0121	N17	W51	.798	15044	2.2	11D	-F	3	V		25		F	YS
GRP65133	06	0142+4	0145+2	0153	S18	W04	.320	15049	5.8	11	-N							
CULG	06	0142	0145	0157	S18	W05	.324	15049	5.7	15	-F		C	0145	20	.2	T	
MITK	06	0145	0146	0152	S18	W05	.324	15049	5.7	7	-N		C	0146	150	1.6		
VORO	06	0145	0147	0154	S17	W04	.304	15049	5.8	9	-B		C	0147	90	1.0		
PALE	06	0146	0148	0152	S21	E00	.363	15049	6.1	6	-F	3	V		38		DE	
134 PALE	06	0206	0210	0216	S26	E71	.957	15056	11.4	10	-F	3	V		18		DE	YS
GRP65135	06	0235+0	0235+0	0251	S21	00	.363	15049	6.1	16	-F				20	.2	F	
PALE	06	0235	0235	0251	S21	E00	.363	15049	6.1	16	-F	3	C		24		F	
PALE	06	0235	0235	0251	S21	E00	.363	15049	6.1	16	-F	3	V		24		F	
GRP65136	06	0339+1	0346+1 0358	0403	S19	W06	.344	15049	5.7	24	-F				50	.5	F	
CULG	06	0339	0347	0355	S18	W07	.334	15049	5.6	16	-F		C	0347	30	.3	FT	
MITK	06	0340	0346	0351	S19	W07	.350	15049	5.6	11	-F		C	0346	70	.8	D	
MITK	06	0350	0358	0411	S22	W04	.384	15049	5.9	21	-N		C	0358	50	.6	D	
GRP65137	06	0435+2	0438+1	0445	S17	W06	.313	15049	5.7	10	-F						D	
CULG	06	0435	0438	0447	S18	W06	.329	15049	5.7	12	-F		C	0438	20	.2	T	
MITK	06	0437	0439	0443	S17	W06	.313	15049	5.7	6	-N		C	0439	80	.9	D	
	06	0522	0529	NO FLARE PATROL														
	06	0550	0730	NO FLARE PATROL														
GRP65138	06	0845		0905	S25	E65	.925	15056	11.2	20	-F						D	
BUCA	06	0845		0905	S25	E65	.925	15056	11.2	20	-N		C	0849	53	1.5	D	
KHAR	06	0848E	0848	0855D	S26	E66	.932	15056	11.3	7D	-F		P				D	
139 KHAR	06	0925E	0928	0932D	N17	W55	.835	15044	2.3	7D	-F		P				D	YS
	06	1020	1100	NO FLARE PATROL														
140 KHAR	06	1103E	1116	1125D	S22	W08	.400	15049	5.9	22D	-F		C				D	YS
	06	1130	1140	NO FLARE PATROL														
141 RAMY	06	1243E	1245	1252	S27	E64	.921	15056	11.3	9D	-N	4	C		30		DE	YS

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.		
142 HTPR	06	1254	1256	1306	S27	E65	.927	15056	11.4	12	-F		C	1256	20			Y5
143 HTPR	06	1312	1316	1335	S20	W04	.353	15049	6.3	23	-F		C	1316	30		E	Y5
144 HTPR	06	1352	1352	1358	S27	E64	.921	15056	11.4	6	-N		C	1352	40			Y5
145 HTPR	06	1412	1415	1427	S19	W05	.340	15049	6.2	15	-N		C	1415	60		E	Y5
	06	1535	1646	NO FLARE PATROL														
146 RAMY	06	1651E	1653	1657D	S20	W11	.390	15049	5.9	6D	-N	3	C		79		DE	Y5
	06	1657	1710	NO FLARE PATROL														
147 RAMY	06	1743E	1744	1750D	N17	W59	.870	15044	2.3	7D	-N	4	C		64		DE	Y5
148 RAMY	06	1935E	1938	1945D	S18	W18	.430	15049	5.5	10D	-B	2	C		190		DE	Y5
	06	1945	2110	NO FLARE PATROL														
	06	2128	2240	NO FLARE PATROL														
149 CULG	07	0120	0135	0145	S19	W15	.409	15049	5.9	25	-F		C	0135	20	.2		Y5
GRP65150	07	0241	0250+3	0314	S24	E57	.868	15056	11.4	33	-F				70	1.4		
MITK	07	0241	0250	0307	S24	E58	.876	15056	11.5	26	-N		C	0250	70	1.5	E	
CULG	07	0248E	0253	0320	S24	E57	.868	15056	11.4	32D	-F		P	0253	70	1.4	F	
GRP65151	07	0333+2	0336+3	0347	S22	W16	.455	15049	5.9	14	-N				110	1.2	EH	
MANI	07	0333	0338	0347	S22	W17	.464	15049	5.9	14	1N	3	P		200	2.3	H	
MITK	07	0334	0339	0349	S22	W17	.464	15049	5.9	15	-B		C	0339	120	1.4	H	
VORO	07	0335	0338	0346	S21	W16	.443	15049	5.9	11	-B		C	0338	99	1.1	E	
CULG	07	0335E	0336	0340D	S22	W16	.455	15049	5.9	5D	-N		P	0336	35	.4		
GRP65152	07	0349+1	0352+0	0402	N14	W64	.905	15044	2.4	13	-N				50	1.2	DJ	
MITK	07	0349	0352	0405	N16	W64	.907	15044	2.4	16	-F		C	0352	50		D	
VORO	07	0350	0352	0359	N12	W65	.910	15044	2.3	9	-B		C	0352	63	1.5	J	
	07	0520	0550	NO FLARE PATROL														
153 CULG	07	0525	0526	0542	N17	W63	.900	15044	2.5	17	-N		C	0526	20	.4		Y5
	07	0558	0620	NO FLARE PATROL														
GRP65154	07	0626E	0626	0646	S26	E55	.858	15056	11.4	20	-F						D	
CULG	07	0626E	0626E	0650	S25	E55	.855	15056	11.4	24D	-F		P	0626	50	1.0		
KODA	07	0626E	0626	0642	S27	E56	.868	15056	11.5	16D	-F		V	0626			D	
	07	0730	0827	NO FLARE PATROL														
155 KHAR	07	0913E	0913	0920D	S22	W12	.423	15049	6.5	7D	-F		P				D	Y5
156 KANZ	07	1000	1005	1015	S26	E51	.825	15056	11.2	15	-N							Y5
GRP65157	07	1039+1	1045+2	1053	N16	W68	.933	15044	2.3	14	-F						D	
KANZ	07	1039	1047	1052	N16	W68	.933	15044	2.3	13	-F							
MONT	07	1040	1045	1053D	N16	W68	.933	15044	2.3	13D	-F		C	1045	20		D	
GRP65158	07	1208+0	1212+2	1238	S25	E52	.831	15056	11.4	30	1N							
KANZ	07	1208	1212	1251	S25	E50	.814	15056	11.3	43	1N							
WEND	07	1208		1225	S25	E52	.831	15056	11.4	17	1N		V		300			
MONT	07	1211E	1214	1223D	S25	E54	.847	15056	11.6	12D	1N		C	1214	250			
159 KANZ	07	1401		1405D	S18	W22	.473	15049	5.9	4D	-B						E	Y5
160 RAMY	07	1540E	1548	1602	S25	E45	.769	15056	11.0	22D	1N	2	C		190		F	Y5
	07	1633	1700	NO FLARE PATROL														
	07	1713	1756	NO FLARE PATROL														
161 PALE	07	1757E	1759U	1821	S27	E46	.786	15056	11.2	24D	2N	3	C		476		F	Y5
	07	1805	1819	NO FLARE PATROL														
GRP65162	07	1826	1830 1905	1934D	S27	E47	.795	15056	11.3	68	1N							
PALE	07	1826	1830	1847	S27	E46	.786	15056	11.2	21	1F	3	C		183		FDE	
HCMA	07	1827E		1859D	S27	E48	.804	15056	11.4	32D	-N		P	1827	100			
PALE	07	1849	1905	1934D	S27	E46	.786	15056	11.2	45D	1N	3	C		224		FDE	

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Dsk	CORR AREA Sq. Deg	
GRP65163	07	1905+0	1907+0	1916	N15	W73	.959	15044	2.3	11	-F				60		
PALE	07	1905	1907	1916	N15	W73	.959	15044	2.3	11	-F	3	V		63		DE
PALE	07	1905	1907	1916	N15	W73	.959	15044	2.3	11	-F	3	C		63		DE
RAMY	07	1910E	1910U	1916	N14	W72	.954	15044	2.4	6D	-N	2	C				F
164 MCMA	07	1940E		1955D	S27	E50	.821	15056	11.6	15D	-N		P	1940	50		E Y5
GRP65165	07	1945E	1947	1959	N15	W71	.949	15044	2.5	14	-N						EH
RAMY	07	1945E	1947	1959	N15	W70	.944	15044	2.6	14D	-N	3	C				H
MCMA	07	1946E		1955D	N16	W73	.959	15044	2.3	9D	-N		P	1946	30		E
GRP65166	07	1951E	1953	2018D	S19	W22	.483	15049	6.2	27	1B						FH
RAMY	07	1951E	1953	2018	S18	W21	.462	15049	6.3	27D	1B	3	C		222		F H
MCMA	07	1954E		2003D	S20	W22	.492	15049	6.2	9D	-B		P	1955	100		E
CULG	07	2015E	2015U	2105	S19	W24	.505	15049	6.0	50D	-N		P	2015	80	.9	F
167 CULG	07	2058	2101	2105	S25	W21	.535	15049	6.3	7	-N		C	2101	30	.4	Y5
168 CULG	07	2109	2115	2116D	N14	W72	.954	15044	2.5	7D	-N		C	2115	20		Y5
169 PALE	07	2130	2150	0049	S27	E44	.769	15056	11.2	199	N	3	C		334		U F Y5
	IMP. 1 NO 1 CULG1																
	07	2152	2332	NO FLARE PATROL													
170 VORO	08	0056E		0120	S26	E45	.772	15056	11.4	24D	FN		C	0107	134	2.1	EJ Y5
	IMP. 1 NO 1 PALE																
171 PALE	08	0124	0126U	0126D	S27	E42	.749	15056	11.2	2D	-F	3	C		75		DE F Y5
GRP65172	08	0151+4	0155+0 0215+0	0256	S26	E41	.735	15056	11.2	65	1N						JU
VORO	08	0151	0155	0205	S25	E41	.730	15056	11.2	14	-B		C	0155	108	1.6	EJ
KODA	08	0152E	0155	0228	S27	E41	.748	15056	11.2	36D	-F		P	0152	135	1.4	E
PALE	08	0155	0155	0256	S27	E42	.749	15056	11.2	61	1N	3	C		312		U F
PALE	08	0155	0155	0202D	S27	E42	.749	15056	11.2	7D	1N	3	V		222		DE F
MANI	08	0158E	0158U	0202D	S26	E42	.744	15056	11.2	4D	-N	3	V		70	1.1	
CULG	08	0210	0215	0300	S25	E40	.720	15056	11.1	50	-N		C	0215	50	.8	F
VORO	08	0213	0215	0219D	S25	E40	.720	15056	11.1	6D	1N		C	0215	143	2.1	D
173 CULG	08	0543E	0543U	0549D	N15	W79	.983	15044	2.3	6D	-N		P	0543	25		Y5
174 ATHN	08	0628E	0635	0650D	S28	E41	.746	15056	11.3	22D	-N	1		0635	82	1.1	Y5
	08	1139	1156	NO FLARE PATROL													
	08	1212	1221	NO FLARE PATROL													
	08	1415	1535	NO FLARE PATROL													
175 RAMY	08	1812E	1815	1828	N26.	E75	.973	15061	14.4	16D	-N	3	C				H Y5
	08	1914	1920	NO FLARE PATROL													
	08	2052	2117	NO FLARE PATROL													
176 CULG	08	2114	2117	2121	S27	E35	.684	15056	11.5	7	-F		C	2117	30	.4	Y5
177 PALE	08	2123	2125	2133	N23	E68	.939	15061	14.0	10	-F	3	C		26		DE Y5
	08	2210	2234	NO FLARE PATROL													
GRP65178	08	2248+0	2248+0	2304	N23	E68	.939	15061	14.0	16	-F				20		F
PALE	08	2248	2248	2304	N23	E68	.939	15061	14.1	16	-F	3	V		22		F
PALE	08	2248	2248	2304	N23	E68	.939	15061	14.1	16	-F	3	C		22		F
GRP65179	08	2312+0	2323+0	2349	N23	E67	.933	15061	14.0	37	-F				20		F
PALE	08	2312	2323	2349	N23	E67	.933	15061	14.0	37	-F	3	C		22		F
PALE	08	2312	2323	2349	N23	E67	.933	15061	14.0	37	-F	3	V		22		F
180 CULG	09	0005	0007	0016	S23	E25	.550	15056	10.9	11	-F		C	0007	20	.2	T Y5
181 PALE	09	0009	0010	0014	N23	E67	.933	15061	14.0	5	-F	3	V		20		FDE Y5
182 MITK	09	0034	0037	0054	N26	E72	.961	15061	14.4	20	-N		C	0037	60		D Y5
GRP65183	09	0055+8	0106+1	0117	N24	E70	.950	15061	14.3	22	-N				70		GJ
MITK	09	0055	0107	0117D	N25	E72	.960	15061	14.4	22D	-N		C	0107	60		E
PALE	09	0103	0107	0126	N23	E66	.928	15061	14.0	23	-F	3	V		62		FDE
VORO	09	0103	0106	0116	N24	E70	.950	15061	14.3	13	1N		C	0106	99	2.9	DGJ

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG.	TYPE	TIME UT	MEAS. AREA Millionths of Disk	CORR AREA Sq. Deg.	
184 CULG	09	0120	0126	0138	S24	W39	.703	15049	6.1	18	-F		C	0126	20	.2	Y5
GRP65185	09	0133+3	0135+1	0148	S27	E29	.626	15056	11.2	15	-N				60	.8	HJK
VORO	09	0133	0135	0156D	S28	E32	.662	15056	11.5	23D	-B		C	0135	90	1.0	DHJK
PALE	09	0136	0136	0139	S26	E27	.598	15056	11.1	3	-F	3	V		44		F H
186 PALE	09	0212	0221	0317	S26	E26	.588	15056	11.0	65	-F	3	V		43		FDE Y5
187 PALE	09	0239	0241	0259	N23	E66	.928	15061	14.1	20	-F	3	V		41		F H Y5
188 VORO	09	0346	0347	0354	S26	E30	.627	15056	11.4	8	-N		C	0347	99	1.3	EJ Y5
	09	0622	0625	NO FLARE PATROL													
189 CULG	09	0650	0652	0714	S24	W41	.724	15049	6.2	24	-N		C	0652	55	.8	V Y5
190 CULG	09	0655	0658	0715	S28	E38	.643	15056	11.5	20	-N		C	0658	100	1.3	T Y5
	09	0710	0718	NO FLARE PATROL													
	09	0749	0754	NO FLARE PATROL													
	09	0814	0821	NO FLARE PATROL													
	09	0853	0913	NO FLARE PATROL													
	09	0928	1003	NO FLARE PATROL													
	09	1011	1052	NO FLARE PATROL													
	09	1116	1117	NO FLARE PATROL													
191 RAMY	09	1137E	1141	1151	S26	E26	.588	15056	11.4	14D	-N	3	C		32		F Y5
	09	1235	1411	NO FLARE PATROL													
192 RAMY	09	1448	1450	1502	S24	E17	.485	15056	10.9	14	-N	3	C		48		Y5
	09	1550	1605	NO FLARE PATROL													
	09	1659	1732	NO FLARE PATROL													
193 PALE	09	1747	1752	1801	N24	E60	.890	15061	14.2	14	-F	3	C		13		DE Y5
194 PALE	09	1813	1813	1817	S26	E18	.518	15056	11.1	4	-F	3	C		36		F Y5
195 PALE	09	1815	1831	1900	N24	E59	.883	15061	14.2	45	-F	3	C		17		F Y5
196 PALE	09	1857	1900	1908	S26	E18	.518	15056	11.1	11	-F	3	C		34		FDE Y5
197 PALE	09	1918	1919	1926	S26	E18	.518	15056	11.2	8	-F	3	C		19		F Y5
GRP65198	09	1939	1940	2045	S26	E17	.510	15056	11.1	66	-N						
			2027+6														
PALE	09	1939	1940	2050	S26	E17	.510	15056	11.1	71	-F	3	C		134		DE F
PALE	09	1939	2027	2050	S26	E17	.510	15056	11.1	71	1N	3	C		272		DE F
RAMY	09	1950E	1950U	1958D	S26	E21	.543	15056	11.4	8D	-F	3	C		120		
CULG	09	2026E	2033U	2045D	S25	E14	.475	15056	10.9	19D	-N		C	2033	20	.2	
RAMY	09	2030	2032	2043	S26	E21	.543	15056	11.4	13	-F	3	C		130		
199 CULG	09	2045E	2103U	2128	S24	E37	.683	15056	12.6	43D	?F		P	2103	60		Y5
	IMP,1 NO PALE2																
200 CULG	09	2137	2142	2155	S29	E21	.576	15056	11.5	18	-N		C	2142	30	.4	Y5
	09	2142	2252	NO FLARE PATROL													
201 MANI	09	2325E	2325U	2327D	S28	E22	.573	15056	11.6	2D	-F	2	V		20	.2	Y5
	09	2327	2339	NO FLARE PATROL													
	09	2341	2348	NO FLARE PATROL													
	09	2352	0003	NO FLARE PATROL													
202 PALE	10	0009	0011	0018	S27	E20	.544	15056	11.5	9	-F	3	C		45		FDE Y5
203 PALE	10	0030	0030	0033	S22	W52	.820	15049	6.1	3	-F	3	C		44		F Y5
GRP65204	10	0035	0038	0047	N01	W11	.192	15060	9.2	12	-N				45	.5	
PALE	10	0035	0038	0042D	N01	W12	.209	15060	9.1	7D	-N	3	C		35		FDE
MANI	10	0039E	0039U	0047	N01	W11	.192	15060	9.2	8D	-N	3	V		50	.5	
205 VORO	10	0114	0117	0124	S26	E03	.437	15056	10.3	10	-B		C	0117	45	.5	E Y5

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
GRP65206	10	0301+6	0311+4	0402	S27	E16	.513	15056	11.3	61	1B		C		484	5.6	FJ
VORO	10	0301	0313	0358	S26	E21	.541	15056	11.7	57	2N		C	0313	484	5.6	EJ
MANI	10	0305	0315	0327D	S28	E16	.526	15056	11.3	22D	1B	3	V		220	2.7	F
MITK	10	0307	0312	0405	S27	E18	.528	15056	11.5	58	2N		C	0312	760	9.2	F
CULG	10	0308E	0311	0332D	S28	E16	.526	15056	11.3	24D	1B		C	0311	220	2.5	F
207 MITK	10	0416	0420	0423D	S29	E18	.552	15056	11.5	7D	-N		C	0420	70	.9	D Y5
	10	0423	0430	NO FLARE PATROL													
	10	0440	0445	NO FLARE PATROL													
	10	0446	0453	NO FLARE PATROL													
208 MITK	10	0457	0459	0517	N03	W14	.248	15060	9.2	20	-F		C	0459	110	1.2	E Y5
209 MITK	10	0613	0614	0618D	N16	E90	1.000	15067	17.0	5D	-N		C	0614	50		DH Y5
	10	0731	0821	NO FLARE PATROL													
	10	0849	0853	NO FLARE PATROL													
210 KHAR	10	0957E	0957	1013D	S25	E06	.429	15056	10.9	16D	-F		C				E Y5
211 KHAR	10	1032E	1035	1040D	S26	E14	.486	15056	11.5	8D	-F		C				E Y5
	10	1307	1314	NO FLARE PATROL													
	10	1330	1540	NO FLARE PATROL													
GRP65212	10	1712E	1715 1744	1955	S25	E06	.429	15056	11.2	163	1N						
RAMY	10	1712E	1715	1727D	S25	E08	.437	15056	11.3	15D	-B	4	C		120		
PALE	10	1721E	1744	1955	S26	E04	.439	15056	11.0	154D	1N	3	C		203		DE F
213 PALE	10	2020	2028	2038	S26	E04	.439	15056	11.1	18	-F	3	C		42		DE Y5
214 PALE	10	2157	2159	2201	S22	W64	.913	15049	6.1	4	-F	3	C		46		DE Y5
215 PALE	10	2207	2207	2217D	S22	W64	.913	15049	6.1	10D	-N	3	C		68		DE Y5
	10	2217	2248	NO FLARE PATROL													
216 PALE	10	2336	2343	2344D	S27	E07	.463	15056	11.5	8D	-F	3	C		107		DE Y5
GRP65217	11	0032+2	0038+2 0046	0113	S27	E06	.458	15056	11.5	41	1N				260	2.9	EJU
MITK	11	0022	0039	0115	S27	E08	.465	15056	11.6	53	1B		C	0039	230	2.7	E
CULG	11	0032	004E	0122	S28	E06	.473	15056	11.5	50	-N		C	0046	120	1.3	U
VORO	11	0033	0038	0110	S28	E07	.476	15056	11.5	37	1N		C	0038	287	3.3	EJ
MANI	11	0034	0040	0048	S27	E02	.449	15056	11.2	14	-N	3	P		60	.7	
PALE	11	0035E	0036U	0036D	S27	E06	.458	15056	11.5	1D	1N	3	C		375		DE F
GRP65218	11	0418+1	0422+2	0440	S24	W05	.409	15056	10.8	22	-N				50	.5	E
MITK	11	0418	0422	0440	S24	W04	.406	15056	10.9	22	-N		C	0422	60	.7	E
CULG	11	0413	0423	0444	S24	W05	.409	15056	10.8	26	-F		C	0423	30	.3	
VORO	11	0419	0424	0435	S24	W05	.409	15056	10.8	16	-B		C	0424	63	.7	E
219 MITK	11	0450	0510	0520	S26	E05	.440	15056	11.6	30	-N		C	0510	70	.8	E Y5
GRP65220	11	0945+3	0947+4	1010	S28	E04	.468	15056	11.7	25	-N				170	1.9	EU
HTPR	11	0930	0947	1010	S28	W03	.466	15056	11.2	40	-B		C	0947	180		E
KHAR	11	0945	0947	1010	S28	E04	.468	15056	11.7	25	1F		C	0947	190	2.2	E
TEHR	11	0948	0951	1000	S27	E05	.455	15056	11.8	12	-N	2	C		154		U
GRP65221	11	1208E	1222 1238	1258D	S23	W09	.411	15056	10.8	50	-F						E
LVOV	11	1208E	1238	1258	S23	W09	.411	15056	10.8	50D	1F		C	1238	200	2.3	E
KHAR	11	1210E	1222	1235D	S24	W10	.431	15056	10.8	25D	-F		P				E
222 HCMA	11	1515	1515	1522	N28	E43	.766	15061	14.9	7	-N		C	1515	50		D,H,V Y5
223 HCMA	11	1526	1528	1532	S29	E74	.970	15062	17.2	6	-N		C	1528	30		D Y5
224 HCMA	11	1718	1724	1738	S23	W12	.430	15056	10.8	20	-B		C	1724	75		E,H Y5
225 HCMA	11	1742	1745	1750C	S23	W12	.430	15056	10.8	8D	-N		C	1745	40		D Y5
226 CULG	11	2015	2021	2030	S30	E70	.954	15062	17.1	15	-F		C	2021	50		Y5
227 PALE	11	2032	2034	2054D	S26	W09	.455	15056	11.2	22D	-F	3	C		60		DE Y5

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE — DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONQ	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
	11	2116	2154	NO FLARE PATROL													
GRP65228	11	2154+2	2206 2223	2305D	S27	W05	.455	15056	11.5	71	1N						FJU
PALE	11	2154E	2223U	2242D	S27	W05	.455	15056	11.5	48D	1B	3	C		482		U F
CULG	11	2156	2206	2305D	S27	W05	.455	15056	11.5	69D	1N		C	2206	250	2.9	JU
	11	2231	2241	NO FLARE PATROL													
	12	0212	0220	NO FLARE PATROL													
GRP65229	12	0219	0226 0238	0251D	S27	W08	.463	15056	11.5	32	-N						
CULG	12	0219	0238	0340	S28	W07	.474	15056	11.6	81	-N		C	0238	150	1.7	
KODA	12	0222E	0226	0251	S27	W08	.463	15056	11.5	29D	-N		P	0222	142	1.5	E
MANI	12	0231E	0231U	0235D	S26	W11	.464	15056	11.3	4D	-F	2	V		100	1.1	F
	12	0251	0310	NO FLARE PATROL													
	12	0435	0627	NO FLARE PATROL													
230 CULG	12	0500	0505	0525	S28	W08	.478	15056	11.6	25	-F		C	0505	15	.2	Y5
	12	0652	0736	NO FLARE PATROL													
GRP65231	12	0743	0746	0806	S27	W09	.468	15056	11.6	23	-F				110	1.2	
TEHR	12	0743	0746	0756	S27	W07	.459	15056	11.8	13	-F	2	C		127		
MANI	12	0752E	0752U	0815	S27	W11	.478	15056	11.5	23D	-F	2	V		90	1.0	
GRP65232	12	1049E	1055+5	1107	S28	W13	.503	15056	11.5	18	-F				60	.7	D
KHAR	12	1049E	1055	1107D	S28	W18	.537	15056	11.1	18D	-F		C				D
HONT	12	1058E	1100	1106	S28	W11	.492	15056	11.6	8D	-F		C	1100	40		E
ABST	12	1101E	1101	1103D	S28	W10	.487	15056	11.7	2D	-N		P	1101	87	1.0	D
GRP65233	12	1122+3	1130+7 1157	1225	S27	W13	.489	15056	11.5	63	1N				310	3.5	E
HERS	12	1122	1137	1216	S27	W13	.489	15056	11.5	54	1B		S				
KHAR	12	1123	1130	1225D	S28	W14	.509	15056	11.4	62D	1F		C	1130	275	3.2	E
HONT	12	1125	1132	1238	S27	W12	.483	15056	11.6	73	1N		C	1132	350		
RAMY	12	1155E	1157	1210D	S26	W13	.476	15056	11.5	15D	-N	3	C		150		
	12	1331	1355	NO FLARE PATROL													
	12	1408	1520	NO FLARE PATROL													
	12	1536	1604	NO FLARE PATROL													
	12	1719	1809	NO FLARE PATROL													
234 PALE	12	1816	1816	1831	S27	W15	.503	15056	11.6	15	-F	3	C		28		DE Y5
235 PALE	12	1833	1834	1838	S27	W15	.503	15056	11.6	5	-F	3	C		24		DE Y5
GRP65236	12	1846	1850+0	1900	S27	W16	.510	15056	11.6	14	-N				150	1.7	U
PALE	12	1846	1850	1903	S27	W15	.503	15056	11.7	17	-N	3	C		196		U F
RAMY	12	1849E	1850	1856	S28	W17	.529	15056	11.5	7D	-N	3	C		111		DE
	12	1924	2007	NO FLARE PATROL													
	12	2019	2102	NO FLARE PATROL													
GRP65237	12	2127+4	2132+2	2149	S26	W20	.529	15056	11.4	22	-F						
PALE	12	2127	2132	2152	S26	W20	.529	15056	11.4	25	-F	3	C		88		FDE
CULG	12	2131	2134	2145	S26	W20	.529	15056	11.4	14	-F		C	2134	20	.2	
	12	2204	2214	NO FLARE PATROL													
238 PALE	12	2254	2255	2347	S26	W21	.538	15056	11.4	53	-F	3	C		50		U F Y5
	12	2302	2343	NO FLARE PATROL													
239 CULG	12	2315	2323	2350	N17	W56	.847	15065	8.8	35	-F		C	2323	20	.2	Y5
GRP65240	13	0033+1	0038+1	0113	S26	W20	.528	15056	11.5	40	1N						FU
PALE	13	0033	0039	0048D	S26	W24	.564	15056	11.2	15D	1N	3	C		325		U F
CULG	13	0033	0038	0105	S26	W20	.528	15056	11.5	32	-N		C	0038	65	.8	
MITK	13	0034	0039	0120	S27	W20	.539	15056	11.5	46	1N		C	0039	170	2.1	

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX LONG. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN		CONF	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
GRP65241	13	0136+1	0139+0	0200	S27	W22	.556	15056	11.4	24	-N						J
HITK	13	0136	0139	0157	S27	W22	.556	15056	11.4	21	-N		C	0139	80	1.0	E
VORO	13	0136	0139	0159	S28	W20	.551	15056	11.6	23	-B		C	0139	108	1.3	EJ
CULG	13	0136	0139	0200	S28	W21	.555	15056	11.5	24	-N		C	0139	65	.8	F
PALE	13	0137	0139	0201	S26	W25	.573	15056	11.2	24	1N	3	C		203		FDE
PALE	13	0137	0139	0140D	S26	W24	.564	15056	11.3	3D	1N	3	V		200		FDE
242 VORO	13	0422	0422	0427	N25	E19	.523	15061	14.6	5	-B		C	0422	36	.4	E Y5
243 CULG	13	0637	0641	0700	S27	W24	.574	15056	11.5	23	-F		C	0641	15	.2	Y5
GRP65244	13	1741	1743+0	1753	S26	W33	.652	15056	11.3	12	-N				90	1.2	
PALE	13	1741	1743	1752	S26	W33	.652	15056	11.3	11	-N	3	C		63		FDE
RAMY	13	1742E	1743	1753	S26	W33	.652	15056	11.3	11D	-N	3	C		127		F
245 RAMY	13	1915E	1922	1929	S27	W29	.620	15056	11.6	14D	-N	3	C		95		F H Y5
246 RAMY	13	2045E	2048	2052	S23	E17	.466	15062	15.1	7D	-F	2	C		48		F Y5
	14	0800	0807	NO FLARE PATROL													
247 HTPR	14	1014	1018	1023	S23	E09	.405	15062	15.1	9	-F		C	1018	40		E Y5
GRP65248	14	1445	1447 1451+5	1513	S26	W43	.749	15056	11.4	28	-F						
HTPR	14	1445	1447	1449	S27	W41	.735	15056	11.5	4	-F		C	1447	30		
HTPR	14	1446	1451	1513	S26	W45	.767	15056	11.2	27	-F		C	1451	20		
HTPR	14	1446	1456	1513	S26	W45	.767	15056	11.2	27	-F		C				
	14	1535	1733	NO FLARE PATROL													
	14	1738	1748	NO FLARE PATROL													
249 RAMY	14	1848E	1850	1858	S25	W47	.782	15056	11.3	10D	-N	3	C		48		F R Y5
	14	2034	2239	NO FLARE PATROL													
	14	2246	2252	NO FLARE PATROL													
	14	2256	2306	NO FLARE PATROL													
	14	2346	0009	NO FLARE PATROL													
	15	0017	0047	NO FLARE PATROL													
GRP65250	15	1015+2	1021+4	1046	N17	E47	.762	15067	19.0	31	-F						
HTPR	15	1015	1021	1046	N17	E45	.741	15067	18.8	31	-F		C	1021	40		E
ABST	15	1017	1025	1038D	N18	E50	.795	15067	19.2	21D	-F		P	1025	114	1.9	F
GRP65251	15	1134+2	1139+2	1145	S26	W52	.828	15056	11.6	11	-F				35	.6	
HTPR	15	1134	1141	1146	S26	W52	.828	15056	11.6	12	-F		C	1141	50		
KHAR	15	1135E	1140	1145D	S27	W55	.855	15056	11.4	10D	-F		V				E
MONT	15	1136	1139	1144	S26	W51	.820	15056	11.7	8	-F		C	1139	20		D
252 HTPR	15	1254	1302	1308	S26	W53	.837	15056	11.6	14	-F		C	1302	30		E Y5
	15	2221	2228	NO FLARE PATROL													
253 CULG	15	2223	2238	2255	S26	W65	.922	15056	11.1	32	-F		C	2238	30	.8	Y5
254 CULG	16	0017	0032	0050	S23	E11	.414	15062	16.8	33	-F		C	0022	10	.1	Y5
255 HTPR	16	0815	0819	0835	N15	E30	.555	15067	18.6	20	-F		C	0819	20		E Y5
256 HTPR	16	1303	1307	1315	S25	E06	.418	15062	17.0	12	-F		C	1307	30		E Y5
257 HOMA	16	1901		1906D	N25	W22	.554	15061	15.1	5D	-N		P	1901	25		E Y5
	16	2002	2023	NO FLARE PATROL													
	16	2108	2235	NO FLARE PATROL													
258 VORO	17	0127	0128	0132	N18	E10	.367	15067	17.8	5	-F		C	0128	63	.6	EJ Y5
259 CULG	17	0330	0341	0410	S33	W90	1.000	15056	10.4	40	-N		C	0341	20		Y5
	17	0730	0733	NO FLARE PATROL													
	17	0743	0746	NO FLARE PATROL													
	17	1517	1525	NO FLARE PATROL													
260 HTPR	17	1534	1539	1541	N19	E02	.346	15067	17.8	7	-F		C	1539	20		Y5
	17	1542	1820	NO FLARE PATROL													

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS	
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX LONG. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	GMT DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg		
	17	1847	2330	NO FLARE PATROL														
	18	0004	0010	NO FLARE PATROL														
	18	0644	0704	NO FLARE PATROL														
	18	0713	0716	NO FLARE PATROL														
GRP65261	18	0800+9	0812+2	0836	N23	E80	.989	15070	24.3	36	N						D	
ABST	18	0800	0812	0848	N23	E82	.993	15070	24.5	48	N		C	0812	87		D	
	IMP.2 IMP.S																	
HTPR	18	0809	0814	0823	N23	E78	.983	15070	24.2	14	-F		C	0814	20			
GRP65262	18	1343+1	1347+2	1353	N16	W12	.357	15067	17.7	10	-F							
KANZ	18	1343	1347	1350	N16	W10	.340	15067	17.8	7	-F							
HTPR	18	1344	1349	1355	N16	W14	.376	15067	17.5	11	-F		C	1349	10			
	18	1516	1524	NO FLARE PATROL														
	18	1540	1810	NO FLARE PATROL														
	18	1818	1827	NO FLARE PATROL														
	18	1840	1904	NO FLARE PATROL														
	18	1930	2310	NO FLARE PATROL														
GRP65263	19	0226+2	0227+2	0234	N17	W16	.410	15067	17.9	8	-N				20	.2	D	
CULG	19	0226	0228	0237	N17	W16	.410	15067	17.9	11	-F		C	0228	20	.2		
VORO	19	0226	0227	0234	N17	W16	.410	15067	17.9	8	-F		C	0227	90	.9	D	
PALE	19	0228	0229	0233	N16	W15	.388	15067	18.0	5	-F	3	C		22		DE	
264 ABST	19	0822	0840	0910	N25	E68	.944	15070	24.4	48	-F		C	0840	61		D	Y5
265 KANZ	19	1048	1052	1059	N19	W59	.878		15.0	11	-F						GD	Y5
266 HTPR	19	1522	1524	1531	N17	W26	.523	15067	17.7	9	-F		C	1524	40		E	Y5
267 CULG	19	2252	2301	2318	N15	W28	.533	15067	17.9	26	-F		C	2300	40	.5		Y5
	19	2317	2334	NO FLARE PATROL														
	18	2330	2331	NO FLARE PATROL														
GRP65268	20	0113+3	0120+0	0133	N18	W30	.579	15067	17.8	20	-N				60	.7	EG	
CULG	20	0113	0120	0140	N19	W19	.465	15067	18.6	27	-F		C	0120	40	.5		
MITK	20	0116	0120	0124	N18	W30	.579	15067	17.8	8	-F		C	0120	70	.9	EG	
VORO	20	0116	0120	0126	N18	W30	.579	15067	17.8	10	-F		C	0120	81	1.0	EG	
269 VORO	20	0243	0244	0250	N21	E55	.851	15070	24.2	7	-F		C	0244	27	.5	D	Y5
270 CULG	20	0637	0640	0650	N19	W31	.598	15067	18.0	13	-F		C	0640	20	.2		Y5
271 HTPR	20	1106	1109	1111	S27	E17	.504	15074	21.7	5	-F		C	1109	10			Y5
	20	1652	1848	NO FLARE PATROL														
	20	1938	2239	NO FLARE PATROL														
	21	0609	0631	NO FLARE PATROL														
	21	0638	0731	NO FLARE PATROL														
	21	1404	1752	NO FLARE PATROL														
	21	1908	1917	NO FLARE PATROL														
	21	2126	2342	NO FLARE PATROL														
272 CULG	22	0526	0628	0634	N17	E90	1.000	15075	29.0	68	?N		C	0634	70			Y5
	IMP.1 NO ! MITK2																	
	22	0725	0728	NO FLARE PATROL														
	22	0746	0844	NO FLARE PATROL														
	22	0903	0910	NO FLARE PATROL														
	22	1042	1052	NO FLARE PATROL														
273 KHAR	22	1052E		1107	N16	E88	1.000	15075	29.1	15D	?F		V				H	Y5
	IMP.1 NO ! KANZ2																	
GRP65274	22	1059	1103+4	1115	N23	E22	.541	15070	24.1	16	-F						D	
KANZ	22	1059	1107	1115	N23	E22	.541	15070	24.1	16	-F						D	
KHAR	22	1103E	1103	1107	N23	E23	.550	15070	24.2	40	-F		P				D	
275 KANZ	22	1111	1124	1150	N17	E90	1.000	15075	29.2	39	-N							Y5
276 KANZ	22	1131		1228	N23	E16	.489	15070	23.7	57	-F							Y5
277 KANZ	22	1239	1243	1251	N17	E90	1.000	15075	29.3	12	-N							Y5
	22	1352	1727	NO FLARE PATROL														

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	GMT DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
	23	0611	0748	NO FLARE PATROL													
278 CULG	23	0631	0640	0712	N23	E06	.432	15070	23.7	41	-N		C	0640	40	.4	Y5
	23	0757	0803	NO FLARE PATROL													
279 KANZ	23	1016	1020	1027	S26	W23	.540	15074	21.7	11	-F						Y5
280 KANZ	23	1138	1138	1141	N23	E10	.450	15070	24.2	3	-B						D Y5
281 MCMA	23	1457	1458	1508	N23	E08	.440	15070	24.2	11	-N		C	1458	50		E,H Y5
282 MCMA	23	1814E	1819	1855D	N13	E78	.981	15075	29.6	41D	-N		C	1818	15		D Y5
283 MCMA	23	1956E		1959D	N21	E77	.980	15075	29.6	3D	-F		P	1956	20		D Y5
284 CULG	24	0010	0023	0045	N22	W06	.418	15070	23.6	35	-F		C	0023	20	.2	Y5
285 CULG	24	0342	0343	0350	N20	W04	.380	15070	23.9	8	-F		C	0343	20	.2	Y5
286 CULG	24	0755	0757U	0800D	N24	W04	.443	15070	24.0	5D	-F		P	0757	20	.2	Y5
287 ABST	24	0903	0906	0958D	N26	E76	.979	15075	30.1	55D	1F		P	0906	79		DH Y5
288 ABST	24	0916	0945	0958D	N27	W05	.491	15070	24.0	42D	-F		P	0945	70	.8	FH Y5
	24	1229	1240	NO FLARE PATROL													
	24	1310	1523	NO FLARE PATROL													
GRP65289	24	1845	1851+1	1911	N21	W12	.436	15070	23.9	26	-F						
PALE	24	1845	1852	1908	N22	W12	.450	15070	23.9	23	-F	3	C		54		FDE
RAMY	24	1848E	1851	1914	N21	W13	.443	15070	23.8	26D	-N	3	C		127		DE
GRP65290	24	2018E	2018+4	2030	S27	W43	.745	15074	21.6	12	-N				68	.9	
PALE	24	2018E	2018U	2022D	S27	W42	.735	15074	21.7	4D	-N	3	C		63		F
RAMY	24	2020E	2022	2030	S27	W44	.754	15074	21.5	10D	-N	3	C		64		DE
291 CULG	24	2344	2345	2358	N18	W15	.421	15070	23.9	14	-F		C	2345	20	.2	Y5
292 CULG	25	0556	0601	0605D	N21	W21	.514	15070	23.7	9D	-N		P	0601	60	.7	Y5
293 ABST	25	0716E	0730	0807D	N22	W21	.525	15070	23.7	51D	-F		P	0730	70	.8	D Y5
294 ABST	25	0727	0729	0752	N19	E49	.794	15075	29.0	25	?N		C	0729	131	2.2	EJ Y5
	IMP-1 NO 8 CULG1																
295 ATHN	25	0835E	0835	0843D	N18	E51	.810	15075	29.2	8D	-N	1		0835	33	.5	Y5
296 ATHN	25	0904E	0905	0910D	S30	W54	.850	15074	21.3	6D	-N	1		0905	21	.3	Y5
GRP65297	25	1356+0	1357+1	1401	S28	W54	.844	15074	21.5	5	-F				25	.5	DH
MCMA	25	1356E	1357	1401	S27	W53	.833	15074	21.6	5D	-F		C	1357	25		D,H
HTPR	25	1356	1358	1400	S29	W56	.862	15074	21.4	4	-F		C	1358	20		
	25	1500	1852	NO FLARE PATROL													
298 PALE	25	1829E	1830U	1830D	S27	W56	.857	15074	21.6	1D	-F	3	C		90		F Y5
299 PALE	25	1912	1918	1933	S27	W56	.857	15074	21.6	21	1N	3	C		184		F H Y5
	25	2052	2100	NO FLARE PATROL													
300 PALE	25	2102	2105	2111	S27	W57	.865	15074	21.6	9	-F	3	C		20		F Y5
301 PALE	25	2143	2144	2153	S26	W55	.847	15074	21.8	10	1N	3	C		170		FDE Y5
302 PALE	25	2304	2306	2308	S26	W56	.855	15074	21.8	4	-F	3	C		21		FDE Y5
303 PALE	25	2312	2313	2323	S26	W56	.855	15074	21.8	11	-F	3	C		53		DE F Y5
304 PALE	25	2348	2349	2352	S26	W56	.855	15074	21.8	4	-F	3	C		26		DE F Y5
GRP65305	26	0053+1	0054+1	0059	S25	W59	.876	15074	21.6	6	-N						DJ
VORO	26	0053	0055	0059	S25	W62	.897	15074	21.4	6	-B		C	0055	90	1.9	DJ
PALE	26	0054	0054	0058	S26	W57	.862	15074	21.8	4	-F	3	C		24		DE

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY			CONF	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
	DEC									MIN.							
GRP65306	26	0125+2	0127+1	0133	S26	W60	.885	15074	21.6	8	-N				60	1.3	J
MANI	26	0125	0128	0133	S26	W60	.885	15074	21.6	8	-F	3	P		20	.3	
VORO	26	0126	0128	0134	S25	W62	.897	15074	21.4	8	-F		C	0128	90	1.9	DJ
PALE	26	0127	0127	0133	S27	W57	.864	15074	21.8	6	-F	3	C		55		DE F
307 PALE	26	0136	0136	0138	S26	W57	.862	15074	21.8	2	-F	3	C		18		DE Y5
308 PALE	26	0140	0142	0145	S26	W57	.862	15074	21.8	5	-F	3	C		22		DE Y5
309 PALE	26	0150	0155	0157	S26	W57	.862	15074	21.8	7	-F	3	C		27		DE F Y5
GRP65310	26	0251+0	0254+3	0302	S26	W60	.885	15074	21.6	11	-N				90	2.0	J
VORO	26	0251	0254	0304	S26	W63	.905	15074	21.4	13	-F		C	0254	81	1.8	DJ
PALE	26	0251	0257	0300	S26	W58	.870	15074	21.8	9	-F	3	C		103		DE F
311 CULG	26	0345	0348	0417	S29	W60	.890	15074	21.7	32	-F		C	0348	30	.7	Y5
GRP65312	26	0447+1	0453	0512	S26	W63	.905	15074	21.5	25	-N						E
MITK	26	0447		0512	S27	W63	.907	15074	21.5	25	-F		C				
VORO	26	0448	0453	0459	S26	W63	.905	15074	21.5	11	1N		P	0453	99	2.2	E
GRP65313	26	0625+3	0629+4	0651	S26	W62	.899	15074	21.6	26	1N						DHKLZ
TACH	26	0625	0633	0645	S25	W60	.883	15074	21.8	20	1F		C	0633	115	3.0	DL
MITK	26	0627	0629	0651	S26	W63	.905	15074	21.5	24	-B		C	0629	60	1.4	DH
MANI	26	0628	0630	0634D	S26	W62	.899	15074	21.6	6D	-F	3	P		50	1.0	
ABST	26	0633E	0654	0708	S26	W64	.912	15074	21.5	35D	2N		P	0654	288		BFKZ
314 KODA	26	0630E	0632	0635	N22	W30	.616	15070	24.0	5D	-B		V	0630			D Y5
315 ABST	26	0719	0724	0817	S25	W68	.935	15074	21.2	58	?N		C	0724	96		DKZ Y5
	IMP.1 NO # TACH2																
GRP65316	26	0821+0	0822+1	0843	N20	W37	.677	15070	23.6	22	-F				60	.8	
ABST	26	0821	0823	0840	N22	W36	.678	15070	23.6	19	-F		C	0823	87	1.2	D
HTPR	26	0821	0822	0845	N18	W38	.676	15070	23.5	24	-F		C	0822	40		E
GRP65317	26	0847+5	0854 0904	0915	S27	W67	.931	15074	21.3	28	-N						DZ
HTPR	26	0847	0904	0912	S29	W67	.933	15074	21.3	25	-F		C	0904		.3	
ABST	26	0852	0854	0917	S25	W68	.935	15074	21.3	25	1N		C	0854	87		DZ
GRP65318	26	0904+1	0907+1	0916	N19	W36	.660	15070	23.7	12	-F						D
ABST	26	0904	0907	0916	N21	W35	.661	15070	23.8	12	-F		C	0907	70	1.0	D
HTPR	26	0905	0908	0916	N18	W38	.676	15070	23.5	11	-F		C	0908	20		
GRP65319	26	0918+1	0920+1	0931	S16	E90	1.000	15081	2.1	13	?N						AEJ
ABST	26	0918	0920	0933	S17	E90	1.000	15081	2.1	15	N		C	0920	201		AEJ
	IMP.2 IMP.S																
HTPR	26	0919	0921	0929	S16.	E90	1.000	15081	2.1	10	-N		C	0921		.3	
320 HTPR	26	0946	0948	0957	S29	W68	.938	15074	21.3	11	-F		C	0948	40		E Y5
GRP65321	26	1000+2	1003+0	1011	S27	W68	.936	15074	21.3	11	-F						DVZ
HTPR	26	1000	1003	1008	S29	W68	.938	15074	21.3	8	-F		C	1003	10		
ABST	26	1002	1003	1013	S25	W68	.935	15074	21.3	11	-F		C	1003	61		DVZ
322 ABST	26	1013	1023	1041	S17	E90	1.000	15081	2.2	28	?N		C	1023	218		EA Y5
	IMP.2 NO # HTPR2																
323 HTPR	26	1101	1102	1103	S29	W69	.943	15074	21.3	2	-F		C	1102	10		Y5
GRP65324	26	1115>9	1159 1207	1223D	S26	W68	.935	15074	21.4	68	-N						HK
HTPR	26	1115	1159	1223	S29	W69	.943	15074	21.3	68	-N		C	1159	40		K
KANZ	26	1130		1156D	S24	W68	.934	15074	21.4	26D	-N						
RAMY	26	1205E	1207U	1221D	S26	W60	.885	15074	22.0	16D	-B	1	C		190		DE H
325 HTPR	26	1159	1208	1225	N24	E56	.869	15079	30.7	26	-F		C	1208	20		E Y5
GRP65326	26	1208	1221+0	1228	S17	E90	1.000	15081	2.3	20	-N						
HTPR	26	1208	1221	1225	S14	E90	1.000	15081	2.3	17	-F		C	1209	20		
RAMY	26	1221E	1221U	1230D	S20	E90	1.000	15081	2.3	9D	1B	2	C				
327 HTPR	26	1250	1253	1257	S29	W69	.943	15074	21.4	7	-N		C	1253	40		Y5

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY			CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	DEC									MIN.								
GRP65325	26	1332	1336+5	1344	S27	W69	.942	15074	21.4	12	-N				50			
HTPR	26	1332	1336	1342	S29	W69	.943	15074	21.4	10	-N		C	1336	70			
RAMY	26	1340E	1341U	1346	S25	W70	.945	15074	21.3	6D	-N	3	C		40		FDE	
GRP65329	26	1430+2	1437+0	1444	S27	W71	.951	15074	21.3	14	-N				25		EHS	
MCMA	26	1430	1437	1444	S25	W72	.955	15074	21.2	14	-B		C	1437	25		E,H,S	
HTPR	26	1432	1437	1443	S29	W70	.948	15074	21.4	11	-N		C	1437	20			
330 MCMA	26	1516	1530	1540D	S25	W72	.955	15074	21.2	24D	-N		C	1530	30		E,K	Y5
GRP65331	26	1555E	1611 1648	1730D	S25	W73	.960	15074	21.2	95	-N						K	
MCMA	26	1555E	1611	1730D	S25	W73	.960	15074	21.2	95D	-N		C	1648	40		D,K	
MCMA	26	1555E	1648	1730D	S25	W73	.960	15074	21.2	95D	-N		C					
	26	1730	1827	NO FLARE PATROL														
	26	1828	2024	NO FLARE PATROL														
	26	2051	2238	NO FLARE PATROL														
GRP65332	26	2322	2327+0	0000	S27	W72	.956	15074	21.6	38	1N						EH	
CULG	26	2322	2327	0000	S28	W76	.973	15074	21.3	38	1N		C	2327	80			
MANI	26	2325E	2327	2338	S26	W72	.956	15074	21.6	13D	-N	3	V		80	1.8		
MITK	26	2358E		0024	S27	W70	.947	15074	21.7	26D	1N		C	2406	110		EH	
GRP65333	26	2335+0	2336+2	2349	N20	W42	.729	15070	23.8	14	-F							
MANI	26	2335	2336	2340	N21	W43	.744	15070	23.8	5	-F	3	V		30	.4		
CULG	26	2335	2338	2358	N20	W42	.729	15070	23.8	23	-N		C	2338	80	1.2		
334 MITK	27	0101	0108	0120	S27	W75	.969	15074	21.4	19	-N		C	0108	50		D	Y5
GRP65335	27	0244+4	0246	0257	S16	E85	.996	15081	2.5	13	-N						EJ	
VORO	27	0244	0246	0255D	S16	E85	.996	15081	2.5	11D	1N		C	0246	72	3.5	EJ	
MITK	27	0248		0257	S16	E85	.996	15081	2.5	9	-F		C					
GRP65336	27	0308+6	0315+1	0329	S15	E86	.997	15070	2.6	21	-N				45		DH	
CULG	27	0308	0315	0337	S16	E87	.998	15070	2.7	29	-N	*	C	0315	40			
VORO	27	0314	0316	0321	S15	E85	.996	15070	2.5	7	1N	*	C	0316	54	2.7	DH	
GRP65337	27	0309+4	0311+3	0320	N25	W41	.745	15070	24.1	11	-B				60	.9	D	
CULG	27	0309	0311	0321	N24	W40	.730	15070	24.1	12	-N		C	0311	40	.6		
MITK	27	0312	0313	0318	N26	W41	.751	15070	24.1	6	-B		C	0313	50	.8	D	
VORO	27	0313	0314	0320	N25	W41	.745	15070	24.1	7	-F		C	0314	81	1.2	D	
338 CULG	27	0438	0442	0457	S18	E80	.984	15081	2.2	19	-N		C	0442	40			Y5
GRP65339	27	0700+3	0705+2	0743	S27	W79	.982	15074	21.4	43	1B						EZ	
ABST	27	0700	0707	0743	S27	W79	.982	15074	21.4	43	2F		C	0707	222		EZ	
CULG	27	0703	0705	0743	S27	W80	.985	15074	21.3	40	1N		C	0705	50			
340 ABST	27	0812	0816	0843	N19	E45	.755	15080	30.7	31	1F		C	0816	253	3.9	FJX	Y5
341 ABST	27 IMP>1 NO # CULG1	0825	0828	0845	S26	W87	.998	15074	20.8	20	?F		C	0828	61		D	Y5
GRP65342	27	0835>9	0837 0848	0904	S18	E79	.981	15081	2.3	29	-N						JZ	
ABST	27	0835	0837	0910	S18	E80	.984	15081	2.4	35	1N		C	0837	175		FJZ	
MONT	27	0845	0848	0858	S18	E79	.981	15081	2.3	13	-F		C	0848	40		E	
343 ABST	27	0846	0849	0853	S26	W79	.982	15074	21.4	7	-F		C	0849	61		D	Y5
344 ABST	27 IMP>1 NO # MONT2 KHAR1	0853	0854	0858	S27	W79	.982	15074	21.4	5	?F		C	0854	87		DVZ	Y5
345 ABST	27 IMP>1 NO # MONT2 KHAR1	0900	0902	0909	S26	W87	.998	15074	20.9	9	?F		C	0902	70		D	Y5
GRP65346	27	1007	1014	1038	S16	E74	.961	15081	2.0	31	1F						D	
ABST	27	1007	1014	1041	S16	E78	.978	15081	2.3	34	1F		C	1014	175		D	
KANZ	27	1023E		1035	S17	E73	.957	15081	1.9	12D	-F						D	
347 ABST	27	1022	1029	1042D	N22	W48	.796	15070	23.8	20D	-F		P	1029	52	.9	D	Y5
GRP65348	27	1045+1	1105	1126D	S25	W79	.982	15074	21.5	41	1N							
KHAR	27	1045E		1115	S26	W82	.990	15074	21.3	30D	1N		V	1101	110			
KANZ	27	1046	1105	1126D	S25	W77	.975	15074	21.7	40D	1B							

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX LONG. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
349 KANZ	27	1055	1105	1110	S27	W13	.465	15077	26.5	15	-F							Y5
350 RAMY	27	1313E	1313U	1320	S17	E71	.947	15081	1.9	70	-F	3	C		64		DE	Y5
GRP65351	27	1435	1442	1458	S15	E71	.946	15081	1.9	23	1N						E	
MCMA	27	1435	1442	1502	S16	E72	.952	15081	2.0	27	1N		C	1442	80		E	
RAMY	27	1449E	1449U	1454	S15	E71	.946	15081	1.9	50	-F	3	C		32		DE	
352 MCMA	27	1513E	1513	1522	S18	E71	.947	15081	2.0	90	-N		C	1513	50		E	Y5
353 MCMA	27	1548E	1548	1554	S16	E74	.961	15081	2.2	60	-F		C	1548	30		D	Y5
354 MCMA	27	1714E		1753D	S28	W88	.999	15074	21.1	390	-F		C	1740			D	Y5
355 MCMA	27	1846E		1849D	S17	E72	.952	15081	2.2	30	1N		P	1846	80		E	Y5
	27	1929	1946	NO FLARE PATROL														
	27	2044	2102	NO FLARE PATROL														
	27	2118	2255	NO FLARE PATROL														
356 CULG	27	2316	2323	2336	N20	E22	.515	15075	29.6	20	-F		C	2323	30	.3		Y5
357 MANI	28	0752	0754	0800	S18	E64	.903	15081	2.1	8	-F	3	P		50	.6		Y5
GRP65358	28	0822+4	0829+2	0850	S17	E63	.895	15081	2.1	28	1N				200	4.6	EH	
CULG	28	0822	0830	0842D	S11	E61	.875	15081	1.9	20D	1N		C	0830	180	3.8		
MANI	28	0825	0829	0843	S16	E63	.894	15081	2.1	18	1N	3	P		250	4.9	H	
ATHN	28	0826	0831	0850	S20	E65	.911	15081	2.2	24	1N	1		0831	164	3.4		
HTPR	28	0829E		0855	S15	E63	.893	15081	2.1	26D	1N		C	0838	118		E	
GRP65359	28	0856+7	0902>9	0948	S19	E68	.930	15081	2.5	52	-N				80		R	
HTPR	28	0856	0913	0943	S17	E68	.929	15081	2.5	47	-N		C	0913	90		E	
TEHR	28	0858	0902	0928	S19	E70	.941	15081	2.6	30	-F	3	C		64		DE R	
ZURI	28	0903	0913	0953	S20	E68	.930	15081	2.5	50	1N		C	0913	80			
MANI	28	0904E	0904U	0920D	S19	E70	.941	15081	2.6	16D	-N	3	V		80	1.7	F	
ATHN	28	0905E	0909	1231D	S21	E65	.912	15081	2.3	206D	-N	1		0909	66	1.6		
360 ZURI	28	1055	1101	1131	S19	E61	.882	15081	2.0	36	1F		C	1101	140	3.1		Y5
361 ZURI	28	1357	1359	1407	S19	E61	.882	15081	2.2	10	1N		C	1359	120	2.7		Y5
362 MCMA	28	1519	1520	1523	N23	E30	.627	15080	30.9	5	-N		C	1520	50		D,V	Y5
363 MCMA	28	1552E	1602	1625	N21	W68	.943	15070	23.6	33D	1N		C	1602	60		E,L	Y5
364 MCMA	28	1607E	1610	1617	S18	E90	1.000	15083	4.4	10D	-N		C	1610			D	Y5
365 MCMA	28	1614	1623	1635	S18	E59	.864	15081	2.1	21	-N		C	1623	80		E	Y5
	28	2051	2131	NO FLARE PATROL														
366 CULG	28	2221	2225	2237	N22	W69	.949	15070	23.8	16	-F		C	2225	20			Y5
GRP65367	29	0005+7	0010+5	0023	N19	W68	.941	15070	23.9	18	-N				70			
CULG	29	0005	0010	0035	N20	W70	.952	15070	23.8	30	1N		C	0010	80			
MANI	29	0008	0012	0023	N20	W65	.925	15070	24.1	15	-N	3	P		80	1.7	F	
PALE	29	0012	0015	0023	N19	W68	.941	15070	23.9	11	-N	3	V		73		FDE	
PALE	29	0012	0015	0023	N19	W68	.941	15070	23.9	11	-N	3	C		73		FDE	
GRP65368	29	0012>9	0035+1	0105	S18	E83	.992	15081	4.2	53	1N				120			
PALE	29	0012	0035	0105	S18	E81	.987	15081	4.1	53	1N	3	C		124		DE	
PALE	29	0012	0035	0105	S18	E81	.987	15081	4.1	53	1N	3	V		124		DE	
CULG	29	0025	0035	0105	S20	E90	1.000	15081	4.8	40	1N		C	0035	60			
MANI	29	0028	0036	0103	S18	E83	.992	15081	4.2	35	1N	3	P		170	3.7		
369 MITK	29	0636		0649D	S17	E85	.995	15083	4.6	130	-N		P	0649	50		D	Y5
370 KANZ	29	0808E		0809	S18	E77	.974	15083	4.1	10	-F						D	Y5
371 MANI	29	0812E	0813	0820D	S18	E78	.977	15083	4.2	80	1N	3	V		100	2.5		Y5
GRP65372	29	0902+2	0905 0912	0915D	S18	E76	.970	15083	4.1	13	-N							
KANZ	29	0902E	0912	0915D	S18	E76	.970	15083	4.1	13D	-F							
MANI	29	0904	0905	0910D	S18	E77	.974	15083	4.2	60	1N	3	V		110	2.7		
	29	0925	0928	NO FLARE PATROL														

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
373 HTPR	29	0928E		0945	S15	E78	.977	15083	4.2	17D	-F		C	0930	10			Y5
GRP65374	29	0947+2	0950+4	0955	S18	E55	.829	15081	2.5	8	-F						E	
HTPR	29	0947	0950	0955	S16	E57	.844	15081	2.7	8	-F		C	0950	30		E	
KANZ	29	0949	0954	0955	S20	E53	.814	15081	2.4	6	-F						E	
GRP65375	29	1008+4	1012+3	1030	S16	E77	.974	15083	4.2	22	-N							
HTPR	29	1008	1015	1028	S15	E78	.977	15083	4.3	20	-F		C	1015	40			
KANZ	29	1012	1012	1032	S18	E76	.970	15083	4.1	20	-B							
GRP65376	29	1028+1	1045 1055	1103	S15	E52	.796	15081	2.3	35	-N						EK	
HTPR	29	1028	1030	1051	S15	E56	.834	15081	2.6	23	-F		C	1030	30		E	
KANZ	29	1029	1045	1103	S16	E49	.766	15081	2.1	34	-N						K	
HTPR	29	1054	1055	1102	S15	E56	.834	15081	2.7	8	-N		C	1055	40		E	
GRP65377	29	1059+0	1103+2 1113	1117	S16	E76	.970	15083	4.2	18	-N							
KANZ	29	1059	1103	1117	S18	E75	.966	15083	4.1	18	-B							
HTPR	29	1059	1105	1107	S15	E78	.977	15083	4.3	8	-F		C	1105	10			
HTPR	29	1109	1113	1116	S15	E78	.977	15083	4.3	7	-F		C	1113	20			
GRP65378	29	1137+1	1141+4	1149	S16	E49	.766	15081	2.2	12	-N				90	1.5	E	
KANZ	29	1137	1141	1157	S16	E48	.756	15081	2.1	20	1N							
HTPR	29	1138	1141	1147	S15	E55	.825	15081	2.6	9	-F		C	1141	110		E	
RAMY	29	1143E	1145	1149	S18	E49	.771	15081	2.2	6D	-N	3	C		80		DE	
GRP65379	29	1305+6	1312+1	1320	S17	E75	.965	15083	4.2	15	-N						D	
RAMY	29	1305E	1313	1321	S17	E79	.981	15083	4.5	16D	-F	2	C				DE	
KANZ	29	1310	1313	1320	S18	E72	.951	15083	3.9	10	-N						D	
HTPR	29	1311	1312	1316	S15	E75	.965	15083	4.2	5	-N		C	1312	20			
380 KANZ	29	1331	1341	1345	S18	E75	.966	15083	4.2	14	-N						D	Y5
GRP65381	29	1406+1	1409+2	1414	S16	E74	.961	15083	4.1	8	-F							
HTPR	29	1406	1411	1414	S15	E75	.965	15083	4.2	8	-F		C	1411	20			
KANZ	29	1407	1409	1413	S18	E74	.961	15083	4.1	6	-N							
382 HTPR	29	1424	1427	1432	S14	E48	.752	15081	2.2	8	-B		C	1427	60		E	Y5
	29	1520	1652	NO FLARE PATROL														
383 RAMY	29	1652E	1652U	1707	S20	E52	.805	15081	2.6	15D	-N	2	C		95		F	Y5
	29	1710	1743	NO FLARE PATROL														
384 PALE	29	1924	1926	1934	N20	E11	.424	15080	30.6	10	-N	3	C		83		DE	Y5
385 PALE	29	1941	1942	1951	S18	E71	.946	15083	4.1	10	-N	3	C		81		DE	Y5
386 PALE	29	2055	2057	2111	N20	E10	.417	15075	30.6	16	1B	3	C		218		DE F	Y5
	29	2131	2300	NO FLARE PATROL														
387 CULG	29	2208	2210	2220	N20	E14	.446	15079	31.0	12	-F		C	2210	30	.3		Y5
388 VORO	30	0020	0026	0046	N21	E10	.433	15079	30.8	26	-F		C	0026	152	1.7	EJ	Y5
389 VORO	30	0043	0046	0056	S20	E45	.733	15081	2.4	13	-F		C	0046	63	.9	D	Y5
390 VORO	30	0101	0102	0106	S19	E69	.935	15083	4.2	5	-F		C	0102	54	1.4	E	Y5
391 VORO	30	0320	0322	0327	N21	E10	.433	15079	30.9	7	-F		C	0322	81	.9	D	Y5
GRP65392	30	0406+2	0411+0 0430	0432	S16	E38	.638	15081	2.0	26	1N						HJU	
HANI	30	0406	0411	0422	S16	E38	.638	15081	2.0	16	1N	3	P		320	4.3	U	
VORO	30	0408	0411	0419	S17	E39	.654	15081	2.1	11	1F		C	0411	152	2.0	HJ	
VORO	30	0420	0430	0441	S17	E38	.642	15081	2.0	21	-F		C	0430	72	.9	DJ	
393 HTPR	30	0934	0934	0936	S14	E32	.553	15081	1.8	2	-F		C	0934	10			Y5
394 HTPR	30	1004	1007	1014	S13	E31	.535	15081	1.7	10	-F		C	1007	70		E	Y5
395 HTPR	30	1020	1023	1036	S13	E31	.535	15081	1.8	16	-B		C	1023	180		E	Y5

Hα SOLAR FLARES

DECEMBER 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE DEC	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.		
GRP65396	30	1247	1256+1	1311	S17	E34	.592	15081	2.1	24	-B						E	
KANZ	30	1247	1256	1311	S16	E33	.575	15081	2.0	24	1N							
RAMY	30	1255E	1257	1310	S17	E34	.592	15081	2.1	150	-B	4	C		90		DE	
KANZ	30	1256	1300	1311	S20	E39	.666	15081	2.5	15	-N						E	
397 KANZ	30	1327	1331	1349	S19	E38	.650	15081	2.4	22	-N							Y5
	30	1447	1454	NO FLARE PATROL														
398 RAMY	30	1550E	1553	1601	S19	E38	.650	15081	2.5	110	-N	3	C.		64		R	Y5
	30	1610	1625	NO FLARE PATROL														
	30	1705	1734	NO FLARE PATROL														
	30	1749	1810	NO FLARE PATROL														
GRP65399	30	1805+0	1807+0	1815	S17	E57	.845	15083	4.0	10	-F				20	.4		
PALE	30	1805	1807	1815	S17	E57	.845	15083	4.0	10	-F	3	C		21		DE	
PALE	30	1805	1807	1815	S17	E57	.845	15083	4.0	10	-F	3	V		21		DE	
400 PALE	30	1838	1838	1856	S18	E33	.584	15081	2.3	18	-F	3	C		43		DE	Y5
	30	1903	1925	NO FLARE PATROL														
401 PALE	30	1903	1906	1914	S17	E57	.845	15083	4.1	11	-F	3	V		71		DE	Y5
402 PALE	30	1908	1909	1957	N20	W03	.390	15080	30.6	49	-F	3	C		26		FDE	Y5
GRP65403	30	1948+0	1951+0	2009	S17	E56	.836	15083	4.0	21	-F				20	.4		
PALE	30	1948	1951	2009	S17	E56	.836	15083	4.0	21	-F	3	V		21		DE	
PALE	30	1948	1951	2009	S17	E56	.836	15083	4.0	21	-F	3	C		21		DE	
GRP65404	30	2010+0	2012+3	2040	S22	E37	.653	15081	2.6	30	-N				40	.5		
PALE	30	2010	2012	2040	S22	E37	.653	15081	2.6	30	-N	3	V		44		DE F	
PALE	30	2010	2012	2040	S22	E37	.653	15081	2.6	30	-N	3	C		41		DE F	
RAMY	30	2013E	2015	2036	S22	E37	.653	15081	2.6	230	-N	3	C		48			
GRP65405	30	2030+0	2032+0	2045D	N20	W03	.390	15080	30.6	15	-F				20	.2		
PALE	30	2030	2032	2045D	N20	W03	.390	15080	30.6	150	-F	3	C		24		DE	
PALE	30	2030	2032	2045D	N20	W03	.390	15080	30.6	150	-F	3	V		24		DE	
	30	2130	2239	NO FLARE PATROL														
GRP65406	30	2244	2251	2258	S17	E28	.515	15081	2.0	14	-F				40	.5	F	
CULG	30	2244	2251	2300	S18	E30	.546	15081	2.2	16	-N		C	2251	30	.3		
MANI	30	2245E	2245U	2255	S16	E26	.482	15081	1.9	100	-F	2	V		50	.5	F	
407 MANI	31	0141	0145	0153	S16	E27	.495	15081	2.1	12	-F	3	P		30	.3		Y5
408 MANI	31	0143	0146	0152	N20	W09	.415	15079	30.4	9	-F	3	P		30	.3		Y5
409 CULG	31	0220	0229	0231	S18	E28	.520	15081	2.2	11	-N		C	0229	50	.6		Y5
410 MANI	31	0330E	0334	0340	S16	E49	.765	15083	3.8	100	-F	3	P		40	.6		Y5
GRP65411	31	0907	0908+4	0915	S16	E44	.710	15083	3.7	8	-F							
HTPR	31	0907	0908	0914	S16	E44	.710	15083	3.7	7	-N		C	0908	120			
MANI	31	0910E	0912	0915	S17	E45	.724	15083	3.8	50	-F	2	V		40	.6		
412 MANI	31	0912	0914	0920D	N19	W10	.406	15080	30.6	80	-F	2	V		50	.5		Y5
413 HTPR	31	1205	1205	1211	S14	E18	.358	15081	1.9	6	-F		C	1205	20			Y5
414 HTPR	31	1309	1313	1316	S15	E42	.684	15083	3.7	7	-F		C	1313	10			Y5
415 HTPR	31	1346	1347	1349	S14	E17	.344	15081	1.8	3	-N		C	1347	20			Y5
416 CULG	31	2328	2337	2352D	S22	E16	.417	15081	2.2	240	1N		C	2337	260	2.9	F	Y5
417 MANI	31	2335E	2335U	2342D	S18	E43	.704	15083	4.2	70	?B	2	V		170	2.4	F	Y5
	IMP.1 NO CULG1																	

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

DECEMBER 1977

DAILY FLARE INDICES
Includes all Flares

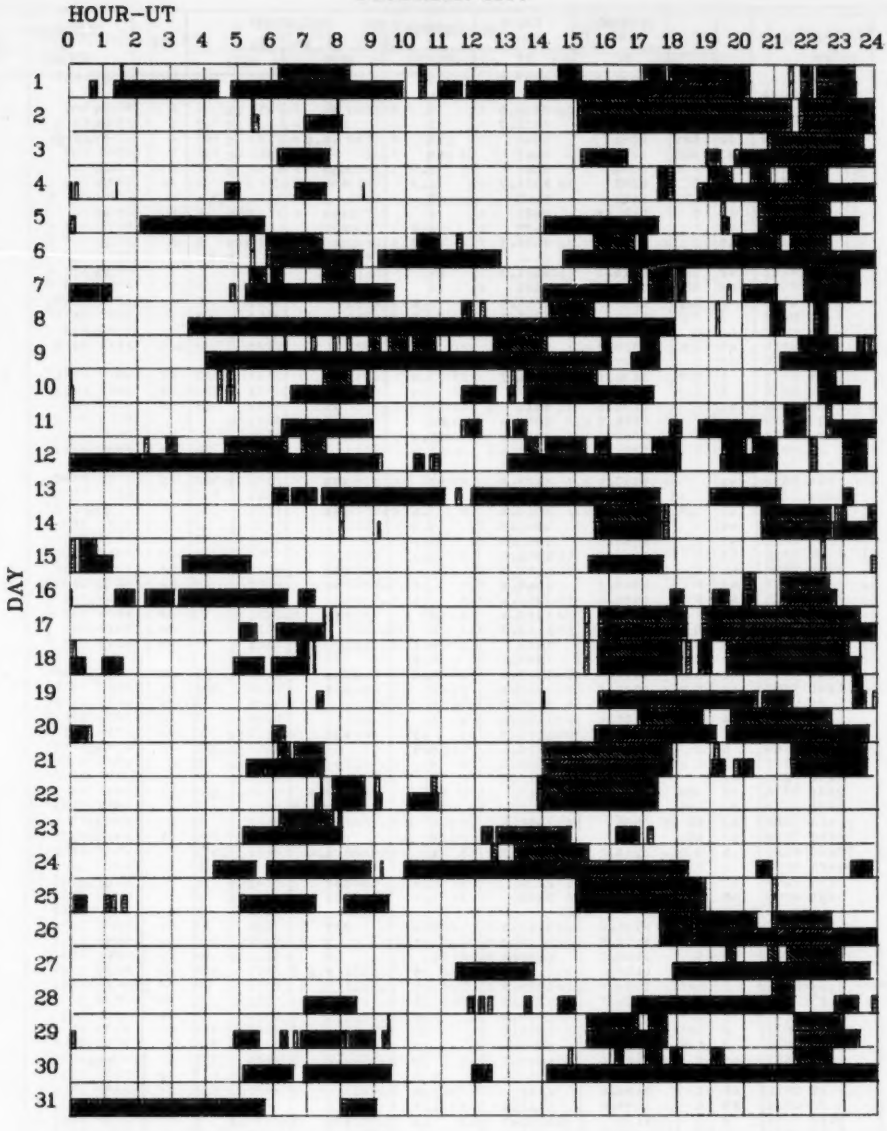
Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.
771201	27.11	16.3	771211	97.43	23.2	771224	37.60	21.6
771202	35.34	15.3	771212	96.95	15.8	771225	32.84	20.0
771203	14.02	21.1	771213	38.26	24.0	771226	44.86	19.3
771204	23.87	21.1	771214	10.90	19.0	771227	53.11	21.8
771205	41.03	21.8	771215	5.29	23.4	771228	41.73	23.3
771206	60.71	17.3	771216	17.99	22.2	771229	103.92	20.4
771207	260.41	19.2	771217	16.32	16.4	771230	62.59	21.3
771208	19.20	21.3	771218	7.13	16.7	771231	59.11	24.0
771209	63.33	17.9	771219	8.70	23.7	771221	0.00	16.5
771210	106.45	20.0	771220	11.70	19.1	771222	10.14	19.1
						771223	19.77	22.3

When no Flare Index is given, it is 0 for that day.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

DECEMBER 1977



Observatories included in total patrol:

Abastumani	Haute Provence	Kharkov	Manila	Tashkent
Athenes	Herstmonceux	Kiev	McMath-Hulbert	Tehran
Bucharest	Huancayo	Kodaikanal	Mitaka	Upice
Catania	Kandilli	Locarno	Monte Mario	Voroshilov
Culgoora	Kanzelhohe	Lvov	Palehua	Wendelstein
			Ramey	Zürich

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
1	200	HIRA	41 F	0225.7	0227.3	3	600			WR
	100	HIRA	41 F	0226	0230	6	1200			WL
	500	HIRA	45 C	0229.6	0230.5	1	34	10		WR
	200	HIRA	45 C	0230.7	0230.7	1	600	60		WR
	3750	TYKW	32 ABS	0240	0440	180	-6.5	-1		074076F
	2000	TYKW	32 ABS	0255	0440	165	-6.5	-2		
	200	HIRA	41 F	0350	0351	2.5	600	30		WR
	100	HIRA	45 C	0350	0350.7	1.3	550	100		WR
	1000	TYKW	32 ABS	0400	0440	70	-1	-.5		
	100	HIRA	45 C	0421.8	0422	1	1150	250		WR
	200	HIRA	41 F	0422.7	0425	4.5	4000			WR
	100	HIRA	45 C	0423.7	0424.3	1.5	1200	800		WL
	9400	TYKW	32 ABS	0425	0440	40	-5	-2.5		
	200	HIRA	42 SER	0618.3	0624.3	14	700			WR
	100	HIRA	42 SER	0618.3	0625	14	1200			WL
	29	UPIC	2 S/F	0745.3	0745.4	.6				
	33	UPIC	3 S	0745	0745.1	.6				
	33	UPIC	45 C	0829.1	0829.6	1				
	29	UPIC	45 C	0829.2	0829.6	1				
	29	UPIC	45 C	0829.2	0829.6	1				
	29	UPIC	4 S/F	0836.1	0836.7	.9				
	33	UPIC	4 S/F	0836.6	0837	1.4				
	260	ONDR	41 F	0855.6	0910	15.5	78			
	113	POTS	41	0856.5	0951.4	86	10000	5		
	29	UPIC	40 F	0856.6	0909.7	15.8				
	33	UPIC	40 F	0856.6	0909.4	17.5				
	237	TRST	41 F	0903.1	0903.6	1.9	75			7R
	234	PCTS	41	0903.2	1002.2	62	350	1		
	202	IZMI	41 F	0908.7	0910.5	3	265			
	237	TRST	42 SER	0909	0910.4	2.4	850			23R
	33	UPIC	40 F	0943.2	0951.5	9.8				
	29	UPIC	40 F	0943.9	0951.5	9.1				
	29	UPIC	40 F	0943.9	0951.5	9.1				
	260	ONDR	46 C	0946	1001.8	24	152	5		
	237	TRST	41 F	0949.8	0949.9	.2	86			9R
	237	TRST	41 F	0951.4	0951.4	.1	480			10R
	536	ONDR	40 F	0951	1003.4	15	13			
	33	UPIC	46 C	0959.8	1003.7	6				
	29	UPIC	46 C	0959.9	1004	6.1				
	408	TRST	42 SER	1000.4	1003.6	4.5	92			
	237	TRST	42 SER	1000.4	1002.3	5.3	1280			20R
	202	IZMI	41 F	1002.3	1002.3	2	410			
	29	UPIC	4 S/F	1101.4	1101.7	1				
	33	UPIC	4 S/F	1101.4	1101.6	1				
	113	POTS	3 S	1101.5	1101.5	.3	500	50		
	245	SGMR	6 S	1322.5	1328.4	8.9	50.7	15.2		3G
	113	POTS	41	1322.8	1330.6	8	700	10		
	234	POTS	41	1324.8	1326.5	6	100	3		
	2800	OTTA	32 ABS	1605	1617	25	-2.2	-1.1		
	2800	OTTA	32 ABS	1800	1817	25	-2.4	-1.2		
	410	SGMR	43 NS	1856	1900.4	129 D	35.3			3S
	245	SGMR	43 NS	1856	1900.4	129 D	183			3S
	2695	PENT	1 S	2013.2	2013.7	1	1.4	.7		
	1420	BCUL	8 S	2013	2013.5	1.5	3	1		
	100	HIRA	45 C	2231	2233	4.5	900	250		WLWR
	200	HIRA	45 C	2231.7	2233	4.5	550	30		O
2	200	VORO	4 S/F	0116.2	0117.5	2.3	225			
	3750	TYKW	5 S	0118.5	0118.9	.8	2	.5		
	2000	TYKW	5 S	0118.3	0118.6	1	9	2		OL
	1000	TYKW	5 S	0118.5	0118.7	.8	1.6	.5		OL
	33	UPIC	2 S/F	1004.5	1004.6	.4				
	29	UPIC	2 S/F	1004.7	1004.8	.3				
	33	UPIC	2 S/F	1044.1	1044.4	.6				
	33	UPIC	2 S/F	1044.1	1044.4	.6				
	29	UPIC	2 S/F	1044.4	1044.5	.3				
	237	TRST	41 F	1109.4	1109.5	.5	45			16R
	260	ONDR	4 S/F	1109.4	1109.4	2.5	13	1.6		
	29	UPIC	45 C	1109.6	1111	2.6				
	33	UPIC	45 C	1109.6	1110.3	1.8				
	113	POTS	3 S	1131	1131.2	.2	500	50		
	33	UPIC	8 S	1131.1	1131.2	.4				
	33	UPIC	8 S	1131.1	1131.2	.4				
	29	UPIC	8 S	1131.2	1131.3	.4				
	113	POTS	45 C	1206.4	1207	.8	280	30		
	29	UPIC	42 SER	1206.5	1207.4	11.9				
	33	UPIC	42 SER	1206.8	1207.3	11.5				
	808	ONDR	2 S/F	1251.8	1253.9	2.5	22	2		
	536	ONDR	2 S/F	1252	1253.8	2.5	16	2		
	260	ONDR	4 S/F	1252	1254.2	3.5	22	1.6		
	2695	PENT	20 GRF	1800	1812	40	1.2	.6		
	4995	BCUL	8 S	1853.5	1854	1	8	3		
	4995	BCUL	8 S	1853.5	1854	1	8	3		
	4995	BCUL	8 S	1918	1919	1.5	40	13		
	1420	BCUL	1 S	1918	1918.5	2.5	1			
	2695	BCUL	3 S	1918	1919.5	3.5	4	1		
3	3750	TYKW	5 S	0145	0145.7	5	1.7	.5		075053F
	930	BORD	40 F	0907.2	0907.2	.1	12	2		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	2800	OTTA	20 GRF	1645	1810	200	2.4	1.2		
4	260	ONDR	3 S	1004.8	1004.8	.3	10			
	29	UPIC	2 S/F	1022.4	1022.6	.7				
	33	UPIC	4 S/F	1022.4	1022.5	.7				
	260	ONDR	2 S/F	1225	1226.7	4	4	1.9		
	260	ONDR	2 S/F	1306.2	1306.2	1	5	1.4		
	237	TRST	41 F	1332.9	1333	.1	95			12L
	29	UPIC	8 S	1332.9	1333.1	.7				
	33	UPIC	8 S	1332.9	1333	.7				
	606	SGMR	3 S	1333	1333.1	.3	94.1	28.2		5
	245	SGMR	6 S	1333	1333.1	.3	34.7	10.4		5
	410	SGMR	6 S	1333	1333.1	.3	29.2	8.8		5
	113	POTS	1 S	1333	1333	.2	2500	800		
	260	ONDR	3 S	1333	1333	.3	7			
	2800	OTTA	1 S	1355	1355.5	1	1.2	.8		
	2800	OTTA	1 S	1355	1355.5	1	1.2	.8		
	113	POTS	1 S	1357.5	1357.5	.1	140	45		
	2800	OTTA	240 R	1500	1555	55	1.8	.9		
5	3750	TYKW	20 GRF	0040	0055	30	2.5	1		
	2000	TYKW	20 GRF	0045	0055	45	1.5	.6		
	260	ONDR	43 NS	0848		312 D	20			
	2800	OTTA		1454	1458	185	5.2			
	410	SGMR	43 NS	1523	1907.9	342 D	9.3			3G,5
	245	SGMR	43 NS	1531	1935	334 D	29.5			3G,5
	18	HCMA	6 S	1736	1738	2			1	
	2800	OTTA	20 GRF	1800	1811	75	1.8	1		
	2800	OTTA	2 S/F	2031	2031.5	6	1.6	.8		
	2800	OTTA	2 S/F	2031	2031.5	6	1.6	.8		
	700	SYDN	8 S	2307	2307	.1				
	700	SYDN	8 S	2307	2307	.1				
	200	HIRA	45 C	2307.3	2308	1	700	60		O
	100	HIRA	45 C	2308	2308.3	.5	230 D	200 D		ML
	1400	SYDN	40 F	2309	2309.7	6.2				
	200	HIRA	41 F	2309.3	2312.3	6.5	50			O
	500	HIRA	45 C	2309.3	2311	4	45	15		MR
	100	HIRA	45 C	2309.7	2310.7	1.5	230 D	60 D		ML
	700	SYDN	40 F	2311	2311.3	2				
6	9400	TYKW	20 GRF	0040	0110	60	3	1.5		OL
	3750	TYKW	20 GRF	0000	0050	100	3	1.5		OL
	3750	TYKW	45 C	0142	0147.3	10	2	.5		
	200	HIRA	41 F	0143	0144	5	750			O
	100	HIRA	45 C	0143.7	0144	1	350	50		ML
	3750	TYKW	21 GRF	0200	0250	140	2	1		
	3750	TYKW	5 S	0336.5	0337.6	5	6	1.5		
	5730	IRKU	1 S	0337	0337.7	3	5			L
	3750	TYKW	28 PRE	0430	0436	9	1	.5		
	1000	TYKW	5 S	0435.8	0436.1	.8	1.7	.4		OR
	3750	TYKW	5 S	0439	0439.8	3	10	3		
	3750	TYKW	30 PBI	0442		65	1	.5		
	3750	TYKW	5 S	0444	0444.8	7	3	.8		
	2000	TYKW	5 S	0444	0445	6	1.2	.5		
	2000	TYKW	5 S	0439	0440	2	2	.6		OR
	3180	CRIM	1 S	0644	0649	12	4	1		
	9180	GORK	1 S	0800.9	0802.2	5.6	5.8	3		
	260	ONDR	44 NS	0827 E		343 D	84			
	260	ONDR	44 NS	0827 E		343 D	84			
	127	TCRN	43 NS	1125 U		175 D				
	410	SGMR	43 NS	1340.8	1758.5	444.20	36.5			3S,4,5,CONT
	245	SGMR	44 NS	1203 E	1812.5	542 D	42.2			3S,4,5,CONT
	245	SGMR	44 NS	1203 E	1812.5	542 D	42.2			3S,4,5,CONT
	237	TRST	41 F	1130.8	1130.9	.2	195			7R
	33	UPIC	2 S/F	0844.9	0845.3	.7				
	29	UPIC	2 S/F	0844.9	0845.2	.9				
	536	ONDR	2 S/F	0848.6	0850.5	3	14	5.6		
	237	TRST	41 F	0950	0950.2	.2	60			4R
	29	UPIC	42 SER	1054	1100.5	22.5				
	33	UPIC	42 SER	1054	1100.2	21.8				
	113	POTS	3 S	1059.8	1100.3	1.3	1800	70		
	202	IZMI	5 S	1100	1100.5	.3	78	16		
	536	ONDR	42 SER	1106	1111.8	20	18			
	202	IZMI	5 S	1110.7	1110.7	1	24	10		
	113	POTS	45 C	1115	1115.2	.6	200	20		
	33	UPIC	45 C	1322.4	1323.5	3.3				
	160	DWIN	45 C	1323	1325	4	390	20		
	29	UPIC	4 S/F	1323.1	1323.6	1.1				
	113	POTS	3 S	1323.5	1323.5	.8	500	12		
	29	UPIC	3 S	1325.3	1325.4	.3				
	160	DWIN	45 C	1336.2	1341	7	150	10		
	240	DWIN	45 C	1336	1341	7	150	5		
	930	BORC	3 S	1407.8	1407.9	.2	31	2		
	160	DWIN	45 C	1410.8		14	400 D			
	245	SGMR	49 GB	1410.8	1411.9	14.6	543	163		CONT
	245	SGMR	49 GB	1410.8	1422.2		408			CONT
	245	SGMR	49 GB	1410.8	1601.8		1840			CONT
	307	DWIN	45 C	1410	1419	14	150	30		
	410	SGMR	6 S	1411	1411.9	14.2	22	15		CONT
	410	SGMR	6 S	1411	1419.9		50.1			CONT

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	234	POTS	45	C	1411	1411.3	1.3	175	6		
	237	TRST	41	F	1411.1	1411.3	2	780			0
	113	POTS	45	C	1411.3	1413	2	2800	450		
	606	SGMR	1	S	1411.3	1413.2	2.1	9.3	2.8		CONT
	237	TRST	47	GB	1417.7	1422.1	9.2	210			32R
	930	BORD	41	F	1419	1420.6	4	23	2		
	2800	OTTA			1420 E		5 D	2			
	2800	OTTA	31	ABS	1425	1445	57	-2	-1		
	930	BORD	41	F	1438	1438.9	2	162	2		
	930	BORC	41	F	1445	1446.6	2	23	2		
	930	BORD	41	F	1449	1449.9	2	29	2		
	245	SGMR	6	S	1528.8	1532.9	5.6	114	34.2		5,CONT
	2800	OTTA	45	C	1530	1533.9	6.5	3.2	1.6		
	410	SGMR	6	S	1533	1533.7	2.1	25.9	7.8		5,CONT
	4995	BCUL	45	C	1545.6	1557	20.5	41	13		
	4995	SGMR	4	S/F	1546.1	1547.9	21.9	23.3	11.6		CONT
	4995	SGMR	4	S/F	1546.1	1557.5		38.8			CONT
	245	SGMR	49	GB	1546.1	1546.6	20.4	2440	976		CONT
	410	SGMR	7	S	1546.2	1547.3	20.2	183	73.2		CONT
	418	SGMR	7	S	1546.2	1601.8		140			CONT
	2800	OTTA	40	F	1546.2	1547.7	25	22.4			
	2695	SGMR	4	S/F	1546.4	1547.8	21.7	27.7	8.3		CONT
	2695	SGMR	4	S/F	1546.4	1601.7		26.7			CONT
	606	SGMR	4	S/F	1546.5	1547.5	17.2	27.8	8.3		CONT
	1415	SGMR	22	GRF	1546.5	1547.5	15.5	9.1	2.7		CONT
	1420	BCUL	45	C	1546.5	1547.5	12.5	8	3		
	2800	OTTA	21	GRF	1546	1549	170	5.6	2.6		
	2695	BCUL	45	C	1547	1548.5	21	22	7		
	2800	OTTA	1	S	1615	1616.6	9	1.8	.9		
	2800	OTTA	8	S	1652.9	1653	.4	2.8			
	2800	OTTA	20	GRF	1735	1740	40	1.4	.7		
	2800	OTTA	23	GRF	1900	2010	90	2.8	1.8		
	245	SGMR	49	GB	1931	1934	13	15800	6320		
	410	SGMR	48	C	1932	1932.8	8	845	338		4,CONT,SWF
	606	SGMR	3	S	1932.1	1935.1	8	233	93.2		4,CONT,SWF
	606	SGMR	3	S	1932.1	1935.1	8	233	93.2		4,CONT,SWF
	1420	BCUL	45	C	1932	1934.5	12	79	22		
	4995	BCUL	45	C	1932	1934	8	156	49		
	8800	SGMR	3	S	1933	1934.5	7	385	154		4,CONT,SWF
	9400	HUAN			1933.4			364.2			
	9480	HUAN			1933.4			381			
	9400	HUAN			1933.4			263			
	9400	HUAN	45	C	1933.4	1936.4	3	229.3	177.5		
	9400	HUAN	29	PSI	1936.4	1944.4	8	37.1	15.2		
	4995	SGMR	3	S	1933.5	1935	7.5	243	97.2		4,CONT,SWF
	2695	SGMR	3	S	1933.7	1934.6	8.3	116	46.4		4,CONT,SWF
	1415	SGMR	3	S	1933.8	1934.5	6.2	125	50		4,CONT,SWF
	2695	BCUL	45	C	1933	1935.5	11.5	95	30		
	2800	OTTA	4	S/F	1933	1935	11	116	20		
	15400	SGMR	3	S	1934.1	1936.1	5.9	222	88.8		4,CONT,SWF
	3750	TYKW	20	GRF	2340	2415	150	5	2.5		
	2000	TYKW	20	GRF	2340	2415	110	3	1.5		0R
	9400	TYKW	20	GRF	2345	2415	90	5	2		0L
	1000	TYKW	20	GRF	2410	2450	120	1.6	.8		
7	3750	TYKW	21	GRF	0230	0300	150	4.5	2		076064F
	2000	TYKW	21	GRF	0230	0300	90	2.5	1.2		0R
	9400	TYKW	20	GRF	0245	0300	60	7	3.5		0L
	100	HIRA	45	C	0333.5	0336	7	1200	300		0
	200	HIRA	41	F	0334	0336.2	4	78			WR
	1000	TYKW	45	C	0334	0336.5	4	4	.5		0R
	2000	TYKW	45	C	0335	0336.6	7	5	1		0R
	3750	TYKW	45	C	0336	0336.7	5	4	.5		
	3750	TYKW	5	S	0525	0526.4	5	3.5	1		
	2000	TYKW	5	S	0525	0526.4	3	3	1		0R
	9100	ARCE	24		0804.1		26.3				
	9100	GORK	21	GRF	0811	0837	195	14	7		
	260	ONDR	44	NS	0820 E		328 D	15			
	9100	GORK	1	S	0834.2	0835.2	1.9	9 D			
	113	POTS	41		0904.3	0913.8	13	300	1		
	113	POTS	45	C	0946.5	0946.7	.4	175	8		
	9100	ARCE	22		0954.6	1007.3	32.5				
	1420	ARCE	22		0954.8	1013.3	29				
	3000	BERL	22	GRF	0955	1210	173	9.8			
	9500	BERL	22	GRF	0958	1139.5	154	21			
	1470	BERL	22	GRF	1000 E	1139 D	150	4			
	9100	ARCE	4		1034.1	1035.2	2.5				
	9100	ARCE	29		1036.6		53				
	1420	ARCE	40		1051.3	1102.9	34				
	9100	GORK	1	S	1103	1106	1.4	5.2	2.6		
	9100	ARCE	20		1130.1	1140.1	32				
	8800	ATHN	20	GRF	1132.8	1139.8	21	31.4	18.8		
	4995	ATHN	20	GRF	1134.8	1141	17.2	8.5	5.1		
	9400	HUAN	1	S	1138.1	1142.2	4.1	16.3	6.8		
	1420	ARCE	2		1138.8	1139	2.2				
	29	UPIC	2	S/F	1146.4	1146.5	.5				

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
	33	UPIC	2	S/F	1146.4	1146.8	1.3				
	9400	HUAN	20	GRF	1209.1	1214.8	5.7	9.8	3.3		
	4995	ATHN	1	S	1209.4	1210.1	7.3	8.5	2.5		
	8800	ATHN	3	S	1209.5	1210.3	7.2	23.5	7.1		
	9100	ARCE	3		1209.9	1210.5	1.8				
	9100	ARCE	29		1211.7		11.5				
	29	UPIC	4	S/F	1224.1	1224.5	1.3				
	33	UPIC	4	S/F	1224.2	1224.6	1.8				
	9400	HUAN	20	GRF	1321.6	1442.8	81.2	9.8	3.7		
	113	POTS	3	S	1358.5	1358.6	.7	500	17		
	2800	OTTA			1400	1403	55	6			
	237	TRST	5	S	1424.7	1424.7	.1	105	35		3L
	8800	SGMR	20	GRF	1440	1450.4	98.2	31.5	15.8		SMF
	2800	OTTA	24	R	1530	1536	6	2.8	1.4		
	2800	OTTA	27A	RF	1530		390	2.8	2.6		
	2800	OTTA	24P	R	1536		334	2.8			
	2800	OTTA	21	GRF	1540	1555	55	2.6	1.4		
	410	SGMR	6	S	1556.4	1556.8	4.7	38.8	9.2		SMF
	245	SGMR	6	S	1557.9	1559.5	2.2	77.8	23.3		SMF
	2800	OTTA	1	S	1557.9	1559	3.5	3.2	1.6		
	2695	BOUL	3	S	1559	1600	3	4	1		
	2800	OTTA	1	S	1640	1640.3	2	1.6	.8		
	2695	BOUL	3	S	1650.5	1653.5	7	5	2		
	2800	CTTA	2	S/F	1651.9	1653	2	2.4	1		
	4995	BCUL	1	S	1651	1652.5	2.5	11	3		
	8800	SGMR	4	S/F	1919	1922.1	4	188	75.2		
	2800	OTTA	4	S/F	1945.5	1946.5	2.5	22	5.5		
	4995	BCUL	8	S	1945.5	1946.5	1.5	29	10		
	1420	BCUL	8	S	1945	1946	2.5	24	8		
	2695	BOUL	8	S	1947	1947.5	2	20	7		
	2800	OTTA	2	S/F	1949	1952.5	5	4.8	2.4		
	1420	BCUL	8	S	1950	1950.5	1.5	4	1		
	2695	BOUL	45	C	1951.5	1953	3	5	2		
	2800	OTTA	21	GRF	1955	2035	70	3.2	1.6		
	2800	OTTA	8	S	2047.7	2048	.5	3	1.5		
	2695	PENT	26	FAL	2110	2200	50	-2.8	-1.4		
	1420	BOUL	1	S	2231	2232.5	1.5	1			
	9400	TYKW	32	ABS	2330	2340	60	-4	-2		
	3750	TYKW	32	ABS	2330	2340	58	-3.5	-1.5		
	2000	TYKW	32	ABS	2330	2340	30	-.8	-.4		
8	208	VORO	4	S/F	0022.2	0022.8	1.3	140			
	700	SYDN	45	C	0034	0035	1.7				
	200	HIRA	45	C	0034	0035	2	700	300		O
	500	HIRA	45	C	0034.3	0034.6	1.8	23	5		O
	100	HIRA	45	C	0034.5	0034.8	1.3	500	150		ML
	1400	SYDN	2	S	0034.5	0035	1.2				
	3750	TYKW	5	S	0034	0035	6	1.5	.5		
	2000	TYKW	5	S	0034	0035	3	4	1		OR
	1000	TYKW	5	S	0034	0035	2	12	3		OSR
	208	VORO	4	S/F	0035	0036	2	180			
	3750	TYKW	5	S	0107	0133	35	2	1		257087F
	208	VORO	43	NS	0120		100		7.5		
	3750	TYKW	21	GRF	0145	0230	105	2	1		
	2000	TYKW	21	GRF	0210	0230	80	2	1		OR
	3750	TYKW	5	S	0223.8	0224	1.5	2.5	.5		257087F
	9400	TYKW	5	S	0310.5	0311	1	7	2		OL
	3750	TYKW	5	S	0310	0311.1	4	6.5	1		
	1000	TYKW	5	S	0310.5	0311.1	1.5	1	.3		
	2000	TYKW	5	S	0311	0311.1	1	.8	.2		OR
	3750	TYKW	20	GRF	0340	0410	80	3.3	2		
	3750	TYKW	20	GRF	0500	0510	60	1.4	.7		
	202	IZMI	41	F	0737	0739.3	3	30			
	113	POTS	3	S	0739	0739	.6	700	70		
	260	ONDR	44	NS	0916	E	258	D	14		
	202	IZMI	5	S	0941.7	0942.3	1.5	36	15		
	33	UPIC	45	C	0941.9	0942.5	1.1				
	29	UPIC	45	C	0942.2	0942.9	.9				
	113	POTS	45	C	0942	0942	.8	200	20		
	33	UPIC	2	S/F	0948.2	0948.4	.6				
	29	UPIC	2	S/F	0948.6	0948.8	.4				
	33	UPIC	45	C	1047.4	1047.5	3				
	202	IZMI	41	F	1047.5	1047.5	2.5	60			
	29	UPIC	45	C	1047.6	1047.8	3.2				
	113	POTS	45	C	1047.6	1047.6	1.7	700	20		
	113	POTS	45	C	1047.6	1047.6	1.7	700	20		
	202	IZMI	5	S	1125	1125	.5	35	20		
	245	SGMR	44	NS	1205	E	1344.2	540	D	20.5	3,5
	9400	HUAN	20	GRF	1250.8	1412.8	82	6.5	1.8		
	33	UPIC	2	S/F	1252.9	1253.2	.5				
	33	UPIC	2	S/F	1252.9	1253.2	.5				
	113	POTS	41		1253	1256.7	5.7	200	1		
	29	UPIC	2	S/F	1253	1253.3	.7				
	33	UPIC	8	S	1258.6	1258.7	.5				
	29	UPIC	8	S	1258.6	1258.8	.5				
	33	UPIC	42	SER	1331.8	1353.5	22.7				
	29	UPIC	42	SER	1332	1354.3	22.6				

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	113	PQTS	1 S	1354	1354.1	.1	100	30		
	930	BORD	41 F	1456.6	1456.9	.4	19	2		
	930	BORC	41 F	1533.4	1533.5	.1	18	2		
	2800	OTTA	20 GRF	1550	1640	120	3	1.6		
9	3750	TYKW	5 S	0007	0007.8	6	1.5	.5		
	2000	TYKW	5 S	0007.7	0007.9	.5	1.5	.5		OR
	3750	TYKW	5 S	0240.9	0241	1	2	.5		
	2000	TYKW	5 S	0240.9	0241	1	1.5	.5		OR
	1000	TYKW	5 S	0240.8	0240.9	.3	8	3		OR
	200	HIRA	45 C	0501.5	0502	2	50	20		WL
	3750	TYKW	5 S	0502	0502.4	3	4.5	1		
	2000	TYKW	5 S	0502	0502.4	3	3.5	.8		40L
	1000	TYKW	5 S	0502	0502.5	2	2.3	.5		
	500	HIRA	45 C	0502	0502.3	1	100	20		SL
	100	HIRA	45 C	0502	0502.8	1.5	400	80		O
	3100	CRIM	24 R	0642	0653		7			
	650	GORK	1 S	0652.1	0652.7	1.4	6			
	650	GORK		0652.1	0653.3		20			
	950	GORK	1 S	0653.1	0653.4	.5	8.1			
	9100	GORK	21 GRF	0656.1	0659.3	117	8.9	4.5		
	3100	CRIM	3 S	0656.5	0656.8	.7	9	3		
	9100	GORK	1 S	0656.7	0657.2	1.3	6.8	4.2		
	2950	GORK	1 S	0656.7		1.3				
	4995	MANI	3 S	0656.8	0657	.6	10.4	4.7		
	2695	MANI	3 S	0656.8	0657	.6	10.2	3.6		
	8800	MANI	1 S	0656.8	0657	.6	8.6	3.9		
	202	IZMI	41 F	0712.5	0714	2.5	235			
	4995	ATHN	1 S	0805.8	0806.2	.6	8.4	2.5		
	1415	ATHN	4 S/F	0805.8	0806.2	.5	57.8	17.3		
	1420	ARCE	4	0805.8	0806	1.9				
	3100	CRIM	1 S	0806	0806.2	1	8	3		
	2695	ATHN	1 S	0806	0806.3	.4	6.8	2		
	2695	MANI	3 S	0806	0806.4	1.1	10.2	4.3		
	606	MANI	47 GB	0806	0806.1	.9	580	230		
	1415	MANI	4 S/F	0806	0806.5	3	87.4	30.3		
	4995	MANI	1 S	0806	0806.3	1.1	6.9	2.7		
	9100	ARCE	1	0806.2	0806.4	1.2				
	1470	BERL	4 S/F	0806	0806.3	1	42			
	3000	BERL	1 S	0806	0806.2	1	4.9			
	9500	BERL	2 SF	0806	0806.3	.7	8.8			
	260	ONDR	44 NS	0820 E		340 D	37			
	240	OWIN	44 NS	0856 E		297 D		8		
	160	OWIN	44 NS	0856 F		297 D		3		
	245	SGMR	44 NS	1206 E	2015.5	539 D	33.4			3,5,SWF
	950	GORK	1 S	0846.1	0851	.5	8.1			
	650	GORK	2 SF	0846.3	0851	4.9	9			
	113	PQTS	45 C	0851.4	0851.5	.1	150	40		
	1420	ARCE	20	0926.5	0929	22				
	930	BORC	8 S	0929.2	0929.2	.1	115	1		
	1420	ARCE	1	0954.8	0955	.6				
	536	ONDR	42 SER	0955		32	56	21		
	930	BORC	20 GRF	0959	1003.8	9	10	3		
	888	ONDR	42 SER	1001	1011.8	24	40	2.4		
	1420	ARCE	1	1002.3	1003.6	4				
	127	TORN	45 C	1002.7	1004.5	3.8	37	15		
	1470	BERL	3 S	1002	1004	3.5	5.9			
	9100	ARCE	21	1005.1	1051	94				
	3100	CRIM	1 S	1010	1011	3	2	1		
	33	UPIC	45 C	1010.8	1011.8	1.8				
	113	PQTS		1011.3	1011.8	12	28000	450		
	1420	ARCE	3	1011.4	1011.5	6				
	930	BORC	3 S	1011.4	1011.7	3.6	30	4		
	240	OWIN	45 C	1011.5	1012.5	1	80	20		
	160	OWIN	45 C	1011.5	1012.5	1	400 D			
	408	TRST	2F S	1011.5	1011.6	.4	74	18		
	9500	BERL	3 S	1011.5	1011.7	1.4	15			
	1470	BERL	3 S	1011.5	1012.1	3.5	26			
	3000	BERL	3 S	1011.5	1011.5	2.5	37			
	9100	ARCE	3	1011.6	1011.8	1.2				
	237	TRST	41 F	1011.6	1011.8	1.2	90			0
	9100	GORK	1 S	1011.7	1011.8	1	16.5	8		
	202	IZMI	41 F	1012.5	1013.5	1.2	85			
	1420	ARCE	1	1022.2	1022.3	.5				
	202	IZMI	5 S	1023.2	1023.5	.5	68			
	3100	CRIM	3 S	1024	1025	2	10	3		
	930	BORC	41 F	1025	1026.2	2	21	2		
	1420	ARCE	4	1025.5	1026.1	2.8				
	1470	BERL	3 S	1025.8	1026.5	1.7	67			
	1415	ATHN	4 S/F	1025.8	1026.3	.6	83	24.9		
	9100	GORK	1 S	1025.9	1026.5	1.1	7.9	4		
	2695	ATHN	3 S	1026.1	1026.3	.6	14.6	4.4		
	4995	ATHN	1 S	1026.1	1026.2	.5	5.8	1.7		
	9100	ARCE	1	1026.2	1026.5	1				
	3000	BERL	3 S	1026	1026.5	1	11			

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	9500	BERL	1	S	1026	1026.4	1	4.4			
	202	IZMI	41	F	1110	1159.5	50	25			
	127	TORN	45	C	1210	1210.5	2	90	20		
	237	TRST	41	F	1210.2	1210.9	.7	85			6L
	29	UPIC	45	C	1210.5	1211.4	2				
	33	UPIC	45	C	1210.5	1210.8	1.9				
	113	POTS	45	C	1210.6	1210.7	.4	200	10		
	237	TRST	41	F	1301.4	1301.4	.1	47			8R
	29	UPIC	2	S/F	1311.8	1312.1	.6				
	33	UPIC	2	S/F	1311.9	1312	.2				
	237	TRST	41	F	1349.1	1349.4	.6	60			3R
	930	BORC	8	S	1340.8	1340.8	.2	12	2		
	113	POTS	41		1349.3	1359.8	11	3500	450		
	410	SGMR	6	S	1356.4	1359	2.9	61	12		S,SWF
	15400	SGMR	4	S/F	1356.6	1357.2	2.7	41	8.2		S,SWF
	2800	OTTA	28	PRE	1356	1357.6	2.5	4	2		
	930	BORC	46	C	1357	1359.3	6	88	7		
	2800	OTTA	3	S	1358.5	1359.2	6	66	10.5		
	245	SGMR	6	S	1357.5	1359.5	2.7	53	11		S,SWF
	606	SGMR	47	GB	1358.4	1358.6	.9	650	130		S,SWF
	4995	ATHN	4	S/F	1358.4	1359.2	1.8	55.3	16.6		
	1415	SGMR	4	S/F	1358.5	1359.1	.8	150	31		S,SWF
	1470	BERL	4	SF	1358.5	1359.8	2	80			
	1470	BERL	4	SF	1358.5	1359.8	2	80			
	3000	BERL	4	SF	1358.5	1359	2.5	64			
	9400	HUAN	2	S/F	1358.6	1400.4	1.8	33.7	11.5		
	8800	ATHN	3	S	1358.7	1359.2	1.1	35.9	10.8		
	1415	ATHN	4	S/F	1358.8	1359.2	1.4	110.6	33.2		
	2695	ATHN	4	S/F	1358.8	1359.2	1.7	82.5	24.7		
	9500	BERL	4	SF	1358	1359.2	3	24			
	237	TRST	41	F	1359	1359.6	1	80			8
	33	UPIC	4	S/F	1359.6	1359.9	1				
	29	UPIC	4	S/F	1359.7	1400	.8				
	808	ONDR	4	S/F	1359	1359	2	136	23		
	536	ONDR	4	S/F	1359	1359	2	228	26		
	1420	ARCE	4		1458.6	1459.1	6.4				
	9100	ARCE	4		1458.7	1459.3	2.3				
	2800	OTTA	28	GRF	1515	1555	75	1.6	.8		
	2800	OTTA	20	GRF	1635	1700	70	1.8	.9		
	2800	OTTA	20	GRF	1853	1900	30	1.8	1		
	2695	PENT	21	GRF	2000	2035	90	3	1.6		
	2695	PENT	1	S	2024	2027.5	9	1.6	.8		
	200	HIRA	44	NS	2140 E	0230	340 D	10	5		ML
	208	VORO	44	NS	2300		240		12		
	2695	EOUL	45	C	2215.5	2217	3.5	19	6		
	18	MCHA	6	S	2231	2232	2				
	9400	TYKW	20	GRF	2320	2340	70	5	2.5		0L
	3750	TYKW	20	GRF	2320	2520	180	6	3		
	2000	TYKW	21	GRF	2320	2520	180	4	2		0R
	1000	TYKW	21	GRF	2320	2520	180	2	1		
	2000	TYKW	5	S	2434.5	2435.3	2	1.2	.3		
	1000	TYKW	45	C	2434	2435.3	2	12	2		
10	1000	TYKW	28	PRE	0240	0307	27	1.8	.8		
	2000	TYKW	28	PRE	0240	0306	26	1.4	.7		
	3750	TYKW	28	PRE	0240	0306	26	3	1.5		
	9400	TYKW	28	PRE	0250	0307	17	.7	3		
	2000	TYKW	45	C	0306	0311.7	54	115	25		0L
	2000	TYKW			0306	0320.5		105			10R
	3750	TYKW	45	C	0306	0311.7	24	170	30		20L
	3750	TYKW			0306	0320.3		145			10L,078019F
	5730	IRKU	45	C	0306	0311.7	25	210 D			05R
	5730	IRKU			0306	0313.7		55			R
	5730	IRKU			0306	0317		70			R
	5730	IRKU			0306	0320.3		129			R
	4995	MANI	45	C	0307	0311.8	39	256	86		
	4995	MANI	45	C	0307	0320.8		168			
	606	MANI	47	GB	0307	0320.9	141.2	753.7	203.7		
	9400	TYKW	45	C	0307	0311.7	23	270	45		20L
	9400	TYKW			0307	0320.3		115			20L
	1000	TYKW	45	C	0307	0321	143	245	40		COMPLEX POL.
	1000	TYKW			0307	0311.7		50			
	1000	TYKW			0307	0506.6		240			
	8800	MANI	45	C	0307.9	0311.8	38.6	330	114.8		
	8800	MANI	45	C	0307.9	0311.8	38.6	330	114.8		
	8800	MANI	45	C	0307.9	0320.8		123.4			
	2695	MANI	45	C	0307.9	0311	36.5	131.7	44.5		
	2695	MANI	45	C	0307.9	0320.7		111			
	1415	MANI	45	C	0308	0320.9	49.5	140.8	45.2		
	1415	MANI	45	C	0308	0311.5		65.1			
	2930	VORO	45	C	0308	0312	19	95			
	35000	NAGO	5	S	0309	0311	4	38			
	35000	NAGO	29	PBI	0313	0314	27	19			
	500	HIRA	28	PRE	0310.3	0312.4	6.3	5	.3		WL
	500	HIRA	6	S	0314.6	0315.2	1	12	5		SL
	500	HIRA	48	C	0316.6		240 D		150		
	500	HIRA			0316.6	0321.1		2500			WL

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	500	HIRA		0316.6	0317.9		280			WL
	500	HIRA		0316.6	0350.2		500			MR
	200	HIRA	24 R	0318	0410	240 D	700	400		MR
	100	HIRA	24 R	0323	0410	240 D	1000	650		SR
	9400	TYKW	30 PBI	0330		210 D	15	8	D	
	3750	TYKW	30 PBI	0330		210 D	18	8	D	
	2000	TYKW	30 PBI	0400		180 D	10	6	D	
	3750	TYKW	5 S	0414	0424.1	12	2	1		
	2000	TYKW	5 S	0421	0424.4	6	2	1		OR
	3750	TYKW	5 S	0505.5	0506.6	3	4.5	1		
	2000	TYKW	5 S	0506	0506.6	2	29	7		80L
	500	HIRA	6 S	0506	0506.7	2	6	2		MR
	606	MANI	3 S	0506.9	0507.8	2.1	75	26		SUPERIMPOSED
	1415	MANI	3 S	0506.9	0507.8	1.6	75	25		
	4995	MANI	1 S	0506.9	0507.8	1.5	1.6	.8		
	2695	MANI	1 S	0506.9	0507.8	1.5	8.9	2		
	1000	TYKW	29 PBI	0530		90 D	6	4	D	
	100	GORK	44 NS	0610 E		320		30		
	202	IZMI	44 NS	0700		300	50			
	127	TORN	44 NS	0820 E		340 D				
	260	ONDR	44 NS	0900 E		300 D	20	2		
	245	SGMR	44 NS	1207 E	1825.8	538 D	50.2			3,5,SMF
	15000	KISV	21 GRF	0616	0617	2	5			
	9400	TYKW	5 S	0616.5	0617.1	2	14	3		25L
	9100	GORK	23 GRF	0700	0800.6	109	16	8.5		
	202	IZMI	25 R	0700	0722	120	225	65		
	2695	ATHN	3 S	0749.7	0757.5	14.6	41.9	12.6		
	15000	KISV	45 C	0750	0757.3	28	11			
	2950	GORK	45 C	0751	0757.7	13.5	65			
	2950	GORK		0751	0802.7		28			
	4995	ATHN	3 S	0752.3	0757.5	14.9	37.3	11.2		
	606	MANI	45 C	0752.5	0758.7		90.7			
	606	MANI	45 C	0752.5	0802.8	11.5	168	19.6		
	606	MANI	45 C	0752.5	0802.8	11.5	168	19.6		
	1415	MANI	4 S/F	0752.8	0802.8	12.2	59.8	27		
	4995	MANI	4 S/F	0752.8	0756.8	12.2	32	14.4		
	2695	MANI	4 S/F	0752.8	0756.8	12.2	29.7	13.9		
	3100	CRIM	3 S	0753	0758	7	36	12		
	3000	BERL	46	0753	0757.6	12	30			
	650	GORK	41 F	0753.5	0757.5	10.3	88			
	650	GORK		0753.5	0802.7		94			
	950	GORK	41 F	0753.6	0756.7	10.4	37			
	950	GORK		0753.6	0757.8		33			
	950	GORK		0753.6	0802.9		20			
	9500	BERL	22 GRF	0754.5	0802.5	16	15			
	1415	ATHN	3 S	0754.6	0802.7	8.8	43.6	13.1		
	930	BORD	46 C	0754 E	0756.6	9 D	44			
	8800	MANI	4 S/F	0755	0756.8	10	20	11.5		
	1470	BERL	46	0755	0803.5	10	64			
	1470	BERL	46	0755	0803.5	10	64			
	9100	GORK	2 SF	0755	0757.5	4.1	16	8		
	234	POTS	3 S	0756	0756.5	0.7	2800	150		
	3100	CRIM	3 S	0801.2	0803	3	17	6		
	9100	GORK	2 SF	0802	0802.3	2.5	14	7		
	33	UPIC	45 C	1238.1	1238.4	2.2				
	29	UPIC	45 C	1239.2	1239.6	3.3				
	9100	ARCE	1	1239.6	1240.3	1.6				
	2800	OTTA	20 GRF	1453	1510	45	1.6	.8		
	4995	BOUL	1 S	1454	1454	1.5	7	2		
	2800	OTTA	21 GRF	1615	1635	95	2.8	1.4		
	2800	OTTA	1 S	1624.2	1626.8	6	3.4	1.2		
	2695	BOUL	3 S	1646	1648	4.5	6	2		
	1420	BOUL	1 S	1815.5	1816.5	2	2	1		
	2695	BOUL	1 S	1816.5	1817	1.5	3	1		
	2800	OTTA	1 S	1816	1817	2	1.4	.7		
	1420	BOUL	8 S	1824	1824.5	1	3	1		
	200	HIRA	44 NS	2140 E	0540	580 D	15	7		HLMR
	208	VORO	44 NS	2300		360		10		
	4995	BOUL	3 S	2233	2236	4	9	3		
	2695	BOUL	3 S	2234	2237	5.5	7	2		
	1420	BOUL	3 S	2235	2236	1.5	2	1		
11	3750	TYKW	21 GRF	0005	0023	60	2	1		
	35000	NAGO	20 GRF	0029	0051	61	22			
	208	VORO	46 C	0031	0036	6	170			
	9400	TYKW	45 C	0032	0037	30	9	3		OL
	3750	TYKW	5 S	0032	0036.6	20	6	2		
	8800	MANI	1 S	0032	0035.4	8	5.7	2.1		
	200	HIRA	45 C	0032	0036	9	450	20		ML
	2695	MANI	3 S	0033.7	0036	10.3	2	.6		
	4995	MANI	3 S	0033.7	0037	10	20.1	13.7		
	500	HIRA	45 C	0034	0034.3	1	9	4		SL
	100	HIRA	27 RF	0043	0059	70	40	10		SL
	200	HIRA	27 RF	0048	0058	55	13	5		ML
	9400	TYKW	5 S	0054	0054.6	2	15	4		OL,258003F
	3750	TYKW	21 GRF	0140	0210	80	2	1		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
	2000	TYKW	5	S	0225	0232	35	1.2	.4		
	3750	TYKW	5	S	0238	0231.6	20	2	.5		
	3750	TYKW	21	GRF	0340	0523	200	5	2		258883F
	2000	TYKW	20	GRF	0400	0523	160	2	.7		
	3750	TYKW	5	S	0455	0457	15	3	1		
	100	GORK	44	NS	0600 E		180		5		
	202	IZMI	44	NS	0700		300	50			
	127	TORN	44	NS	0730 E		390 D				
	260	ONDR	44	NS	0810 E		405 D	67	5		
	100	GORK	43	NS	1024		66		5		
	245	SGHR	44-	NS	1208 E	1811.9	537 D	135			
	100	GORK	45	C	0829.6	0829.8	9	10 D			
	100	GORK			0829.6	0830.1		10 D			
	1420	ARCE	20		0935.4	0953	43.5				
	3000	BERL	3	S	0943.5	0944.4	11	8.8			
	9180	GORK	3	S	0944	0944.6	1.1	54	27		
	9180	GORK	29	PBI	0944	0945.1	15.3	14	5		
	3100	CRIM	3	S	0944	0945	10	11	4		
	2950	GORK	1	S	0944.2	0944.8	1.8	14	7		
	15000	KISV	46	C	0944.3	0945	2	12			
	9100	ARCE	3		0944.3	0944.9	2.3				
	9500	BERL	3	S	0944	0944.4	16	32			
	9100	ARCE	29		0946.5		56				
	100	GORK	41	F	1122.5	1123.3	2.4	50			
	100	GORK			1122.5	1124.7		70			
	234	POTS	45	C	1322.2	1322.6	.3	120	10		
	2800	OTTA	27A	RF	1717		225	1.4	1.3		
	2800	OTTA	24	R	1717	1720	3	1.4	.7		
	2800	OTTA	24P	R	1720		200	1.4			
	2800	OTTA	20	GRF	1905	1909	30	4	1.6		
	2695	PENT	26	FAL	2040	2102	22	-1.4	-.7		
	200	HIRA	44	NS	2140 E		580 D	15	10		WLMR
	208	VORO	44	NS	2300		360		14		
	9400	HUAN	45	C	2155.7	2212	16.3	48.6	24.3		
	4995	BCUL	45	C	2155	2159	12	58	18		
	1420	BCUL	1	S	2158.5	2159.5	2.5	4	1		
	9400	HUAN	3	S	2158.7	2201	2.3	42.1	15.6		
	2695	PENT	4	S/F	2158	2200	9	28	7		
	2695	BOUL	45	C	2159	2201	8	25	7		
	1420	BCUL	1	S	2225.5	2226.5	2	2	1		
	2695	PENT	1	S	2226.5	2227	1.5	3.8	1.9		
	700	SYDN	1	S	2226.5	2227.1	.9				
	2695	BCUL	3	S	2226	2227	2.5	5	2		
12	100	HIRA	45	C	0038	0038.2	1	1100	300		WL
	500	HIRA	45	C	0039	0039.7	1	250	100		MR
	3750	TYKW	21	GRF	0135	0226.5	170	17	8		258822F
	2000	TYKW	21	GRF	0135	0225	180	6	3.5		OR
	2695	MANI	1	S	0221.6	0223.2	6.9	6.1	3.1		I
	4995	MANI	1	S	0221.6	0223	6.9	6.6	2.6		I
	9400	TYKW	20	GRF	0222	0230	120	18	9		OL
	35000	NAGO	20	GRF	0224	0240	64	8			
	202	IZMI	44	NS	0700		300	32			
	100	GORK	44	NS	0730 E		240		10		
	127	TORN	44	NS	0730 E	0834.1	390 D	80			
	260	ONDR	44	NS	0834 E		326 D	88	7		
	245	SGHR	44	NS	1209 E	1611	536 D	48.3			
	240	DWIN	44	NS	1329 E		95 D		8		
	160	DWIN	44	NS	1329 E		95 D		10		
	3100	CRIM	24	R	0707	0745		12			
	9100	ARCE	1		0854.6	0855	1.4				
	1420	ARCE	8		0915.9	0916	1.2				
	3000	BERL	3	S	1123.5	1127.5	6.5	11			
	3100	CRIM	3	S	1125	1127	8	10	3		
	3100	CRIM	29	PBI	1125	1135	45 D				
	234	POTS	45	C	1301	1301.6	.8	100	5		
	2695	SGHR	1	S	1421.2	1424.6	3.8	9.6	2.9		
	1415	SGHR	1	S	1422	1423.2	2.8	8.3	2.5		
	4995	SGHR	20	GRF	1422.5	1447.3	60	8.1	3.2		
	8800	SGHR	20	GRF	1422.9	1433.9	22.3	25.2	7.6		
	2800	OTTA	21	GRF	1422	1455	80	3.8	1.7		
	15400	SGHR	20	GRF	1423	1449.7	60	17.2	6.7		
	606	SGHR	4	S/F	1423.4	1423.8	1.6	21.3	4.9		
	9400	HUAN	20	GRF	1423.5	1443.5	20	8.6	4.4		
	2800	OTTA	1	S	1423	1424.1	2	4.4	2.2		
	2800	OTTA	20	GRF	1543	1543.5	30	2.2	1.1		
	2800	OTTA	23	GRF	1655	1730	100	4.2	2.1		
	1420	BCUL	8	S	1722.5	1723.5	2	3	1		
	2800	OTTA	1	S	1722	1728.3	3	6.6	2.2		
	2695	BOUL	8	S	1724	1724.5	2.5	7	2		
	18	MCMA	41	F	2129	2130	3			1	
	208	VORO	44	NS	2300		360		9		
	18	MCMA	41	F	2340	2344	5			1	
13	3750	TYKW	5	S	0038	0038	40	4	1.5		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	9400	TYKW	5 S	0035	0040	30	4	2		0L
	3750	TYKW	45 C	0120	0138.3	60	7	1.5		259042F
	2000	TYKW	5 S	0120	0138.3	60	2.5	.6		0R
	127	TORN	44 NS	0730 E	1023.2	390 D	40			
	260	ONDR	44 NS	0827 E		316 D	27			
	245	SGMR	44 NS	1210 E	1822	535 D	18.9			
	2800	OTTA	22 GRF	1740	1805	45	1.2	.8		
	9400	HUAN	20 GRF	1940.8	2050.7	69.9	6.5	2.4		
	288	VORO	44 NS	2300		360		7		
14	260	ONDR	44 NS	0826 E		314 D	16			
	33	UPIC	1 S	0836.6	0836.8	.5				
	29	UPIC	1 S	0837	0837.1	.4				
	1420	BERL	1 S	1315.9	1316	.6	5.5			
	930	BORD	8 S	1352.4	1352.4	.1	22	1		
	930	BORC	41 F	1419.4	1419.9	.5	37	3		
	2800	OTTA	20 GRF	1443	1518	190	2.2	1.1		
	930	BORD	8 S	1528.7	1528.7	.1	59	1		
15	930	BORC	41 F	1050.8	1050.9	.3	53	2		
16	9100	ARCE	20	0835.6	1025.8	180				
	1428	ARCE	8	0918.1	0918.2	.5				
	930	BORD	8 S	1108.6	1108.7	.1	33	2		
	4995	BCUL	8 S	2141.5	2142.5	2.5	18	6		
	4995	BCUL	8 S	2245.5	2247	2.5	14	5		
17	930	BORC	41 F	1528	1528.8	1.3	38	2		
18	260	ONDR	44 NS	0823 E		386 D	18			
	245	SGMR	43 NS	1305.4	1548	481.6D	16			
	930	BORD	8 S	0907.6	0907.6	.1	12	1		
	2800	OTTA	1 S	1606	1610	10	.8	.5		
19	33	UPIC	42 SER	0747.2	0759.4	12.4				
	29	UPIC	42 SER	0747.5	0759.4	12.1				
	237	TRST	41 F	0902.8	0902.8	.1	100			28L
	260	ONDR	44 NS	0915 E		255 D	15			
	29	UPIC	4 S/F	1001.6	1002	1				
	33	UPIC	4 S/F	1001.6	1001.7	.7				
	33	UPIC	4 S/F	1108.4	1108.6	.9				
	29	UPIC	4 S/F	1108.5	1108.9	.8				
	930	BORC	41 F	1443.4	1443.5	.1	19	2		
20	9100	ARCE	20	0816.1	0834.3	280				
	808	ONDR	3 S	0905.5	0905.5	.4	20			
	536	ONDR	3 S	0905.7	0905.7	.4	13			
	260	ONDR	3 S	0905.8	0905.8	.4	9			
	930	BORD	41 F	1135.4	1135.6	.2	15	2		
	930	BORC	41 F	1426.7	1426.8	.2	17	2		
	4995	BCUL	3 S	2210.5	2212.5	2.5	13	4		
21	260	ONDR	43 NS	0935		248 D	57			
	245	SGMR	44 NS	1215 E	2028.3	533 D	14.5			
	29	UPIC	45 C	1151.2	1153.5	3				
	113	POTS	41	1151.9	1153	1.6	1400	60		
	33	UPIC	45 C	1151	1153.2	3.4				
	237	TRST	41 F	1152.9	1153.3	.4	240			50L
	930	BORD	41 F	1417.9	1418.3	.4	37	2		
	930	BORC	41 F	1539.7	1540.3	.9	41	2		
	18	MCMA	42 SER	1848	1858	15			1	
	18	MCMA	41 F	2046	2047	3			1	
	4995	BCUL	3 S	2050.5	2053	3	9	3		
	288	VORO	43 NS	2349	0258	311	14	9		
22	288	HIRA	43 NS	0400		210 D	20	5		SL
	202	IZMI	44 NS	0700		300	78			
	127	TORN	44 NS	0730 E	0824.6	398 D	35			
	260	ONDR	44 NS	0833 E		322 D	115	9		
	240	OWIN	44 NS	1020 E		237 D		20		
	160	OWIN	44 NS	1020 E		237 D		8		
	245	SGMR	44 NS	1215 E	1415.4	534 D	42.2			S
	418	SGMR	43 NS	1259	1655.8	490 D	25.2			S
	234	POTS	45 C	1030.8	1031	.1	120	20		
	234	POTS	45 C	1056.8	1057.1	.5	100	15		
	234	POTS	45 C	1056.8	1057.1	.5	100	15		
	202	IZMI	7 C	1145.7	1145.8	.7	210	130		
	234	POTS	41	1410.7	1415	4.8	175			
	113	POTS	41	1410.8	1415	4.8	850			
	237	TRST	41 F	1414.7	1415.3	.9	940			8L
	288	HIRA	44 NS	2150 E	2300	580 D	40	7		SL
	288	VORC	44 NS	2300		360		14		
23	108	HIRA	45 C	0634.7	0636	7	1200	300		ML
	200	HIRA	45 C	0635	0636	8	600	100		
	2000	TYKW	5 S	0635	0636.3	3	5	1.5		0SL

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

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	1000	TYKW	5 S	0635.5U	0636.3U	1.5U	2.5U	1 U		50R
	9100	ARCE	20	0822.6	0848.4	44.5				
	3100	GRIN	24 R	0834	1200 D		3			
	260	ONDR	44 NS	0835 E		322 D	34			
	245	SGMR	44 NS	1216 E	1908.8	533 D	57.2			
	410	SGMR	44 NS	1216 E	1810.9	533 D	35.6			
	408	TRST	42 SER	0941.3	0941.3	1.2	42			
	237	TRST	41 F	0941.4	0942.2	1.1	135			5L
	237	TRST	41 F	1259.2	1259.4	.5	115			24L
	208	VORO	44 NS	2300		360		10		
24	282	IZMI	44 NS	0700		300	25			
	127	TORN	43 NS	0900 U	1311.5	320 D	130			
	260	ONDR	44 NS	0915 E		277 D	219			
	245	SGMR	44 NS	1216 E	1730.7	534 D	54.8			3G,4,5
	1470	BERL	22 GRF	1001	1002.5	4.5	24			
	930	BORC	3 S	1001	1002	4	17	4		
	408	TRST	45 C	1001.2	1002	1.5	53	15		
	127	TORN	25 R	1001.5U	1150 U	260 D	20			
	237	TRST	41 F	1001.6	1002.1	1.1	105			6L
	536	ONDR	8 S	1001	1001.8	1.5	21	10		
	1420	ARCE	46	1001	1003.8	4				
	1420	ARCE		1001	1001.8	2.1				
	3000	BERL	22 GRF	1002	1004.2	2.5	5.1			
	1420	ARCE		1003.1	1003.8	1.8				
	237	TRST	41 F	1003.7	1003.9	.8	190			0
	408	TRST	45 C	1003.7	1004.1	.9	28	8		
	650	GORK	1 S	1004 E	1004.4	.8	7			
	2950	GORK	1 S	1004	1004.5	.6	3.6	1.8		
	950	GORK	1 S	1004.1E	1004.4	.8	4.4	2		
	202	IZMI	41 F	1005	1005.5	5	210			
	9100	ARCE	1	1009.8	1010.4	2.8				
	1420	ARCE	1	1010.5	1010.6	.6				
	9100	ARCE	1	1058.4	1059	4				
	1420	ARCE	2	1058	1058.7	1				
	930	BORD	46 C	1209	1212.8	8	39	4		
	1420	ARCE	46	1209.6	1212.7	7.5				
	1420	ARCE		1209.6	1212.7	3.5				
	808	ONDR	4 S/F	1211.6	1212.7	3	40	20		
	536	ONDR	45 C	1212.1	1213.5	2	58	36		
	408	TRST	48 C	1212.1	1212.9	2.3	270			
	237	TRST	41 F	1212.2	1213.7	1.9	75			5L
	33	UPIC	45 C	1212.7	1213.5	1.8				
	1420	ARCE		1213.1	1213.5	4				
	237	TRST	41 F	1225.3	1225.7	1.3	105			5R
	9100	ARCE	20	1240.6	1305.1	42				
	237	TRST	41 F	1301.9	1301.9	.1	95			0
	1420	ARCE	4	1302.9	1304.1	6				
	8800	ATHN	3 S	1302.9	1304.3	3.2	24	7.2		
	1415	ATHN	4 S/F	1302.9	1304.4	3.4	132.4	39.7		
	4995	ATHN	3 S	1302.9	1304.3	3.5	27.7	8.3		
	930	BORC	46 C	1303	1304.2	4	348	25		
	1415	SGMR	4 S/F	1303	1304.2	3.5	150	45		5
	245	SGMR	48 C	1303	1304.3	3.6	650	195		5
	410	SGMR	48 C	1303	1304.2	3.5	1366	410		5
	606	SGMR	47 GB	1303.2	1304.1	2.9	2018	605		5
	2695	SGMR	4 S/F	1303.2	1304.3	3.3	22.5	6.8		5
	237	TRST	41 F	1303.2	1304.1	1.6	1800			10R
	127	TORN	47 GB	1303.2	1304.8	2.8	520			
	4995	SGMR	4 S/F	1303.3	1304.4	2.9	20.8	6.2		5
	408	TRST	48 C	1303.8	1304.1	1.7	270			
	33	UPIC	4 S/F	1303.9	1304.2	1.7				
	808	ONDR	45 C	1303		3.5	610	257		
	127	TORN	8 S	1307.4	1308.1	1.3	530			
	536	ONDR	46 C	1313	1313.5	3	390	173		
	33	UPIC	45 C	1401.9	1402	2.8				
	237	TRST	5 S	1404.7	1404.7	.1	260	65		0
	1420	ARCE	3	1418.7	1419.4	2.2				
	930	BORC	3 S	1418.8	1419.7	2.8	24	5		
	1415	SGMR	4 S/F	1418.9	1419.7	1.8	44.8	8.8		
	4995	SGMR	4 S/F	1419	1419.8	1.5	11.2	2.2		
	245	SGMR	6 S	1419	1419.8	1.7	63.6	19.1		
	606	SGMR	4 S/F	1419	1419.6	1.1	35.3	7.1		
	2695	SGMR	4 S/F	1419	1419.7	1.6	21	4.2		
	2695	SGMR	4 S/F	1419	1419.7	1.6	21	4.2		
	4995	ATHN	3 S	1419.1	1419.9	1.6	13.9	4.2		
	1415	ATHN	3 S	1419.1	1419.8	1.7	36.1	10.8		
	237	TRST	47 GB	1419.1	1419.7	1.5	127			60L
	9100	ARCE	1	1419.2	1419.9	2				
	8800	ATHN	1 S	1419.2	1419.7	1.1	8	2.4		
	410	SGMR	6 S	1419.2	1419.7	1.4	72.5	21.7		
	9100	ARCE	1	1427.3	1427.9	2.4				
	2800	OTTA	28 PRE	1606.1		1.6	1.2			
	2800	OTTA	3 S	1607.7	1608.9	2.5	18	7		
	2695	SGMR	4 S/F	1606.4	1609.1	4.2	22.3	6.7		
	1420	BCUL	45 C	1606	1609	3	13	4		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	MEAN	INT	POLARIZATION OR REMARKS
	410	SGMR	6 S	1607	1607.1	2.7	37.8	11.3		
	8800	SGMR	4 S/F	1607.3	1608.7	3	17.1	5.1		
	4995	BCUL	8 S	1607.5	1608.5	2	31	10		
	1415	SGMR	4 S/F	1607.7	1609	2.4	12.2	3.7		
	4995	SGMR	4 S/F	1608	1608.9	2.1	27.9	8.4		
	606	SGMR	4 S/F	1608.2	1608.3	1.8	75.5	22.7		
	1420	BCUL	8 S	1813.5	1814.5	2	4	1		
	2800	OTTA	1 S	1814	1814.5	1.2	.8	.4		
	606	SGMR	4 S/F	1842.3	1843.6	6.5	21	6.3		3G,4
	4995	BCUL	8 S	1842	1843	1.5	18	6		
	2800	OTTA	22 GRF	1842	1851	30	2			
	245	SGMR	48 C	1843	1846.6	8.8	526	105		3G,4
	410	SGMR	6 S	1843	1843.7	5.6	41.9	12.6		3G,4
	410	SGMR	6 S	2002.2	2002.5	2.2	290	87		
	245	SGMR	6 S	2002.2	2002.7	2.2	79.2	23.8		
	606	SGMR	4 S/F	2002.4	2002.5	1.6	22	4.4		
	245	SGMR	6 S	2015	2017	6	50.9	15.3		
	410	SGMR	6 S	2015.4	2017	6	57.2	17.1		
	606	SGMR	3 S	2015.5	2016.8	4	43	12.9		
	4995	BCUL	3 S	2015.5	2017	4	13	4		
	4995	SGMR	4 S/F	2015.7	2017.7	6.6	10.1	3		
	1420	BCUL	45 C	2015	2016.5	7	18	9		
	2695	SGMR	4 S/F	2016	2017.8	5	7.9	2.4		
	1415	SGMR	3 S	2016.2	2017	4.1	7.5	2.3		
	2695	PENT	2 S/F	2016	2018	6.5	7.2	3.4		
	200	HIRA	44 NS	2150 E	0040	370 D	40	5		SL
	208	VORO	44 NS	2300	0040	360	26	12		
	500	HIRA	45 C	2211.8	2212.2	1	3500	500		SR
25	208	VORO	4 S/F	0200	0206	25	125			
	208	VORO	4 S/F	0427	0429	5	260			
	260	ONDR	44 NS	0830 E		305 D	94	6		
	260	ONDR	44 NS	0840 E		325 D	47	5		
	245	SGMR	43 NS	1354	1526.6	436 D	56			3
	410	SGMR	43 NS	1354	1520.3	436 D	31			3
	3000	BERL	22 GRF	0912	0913.1	1.7	38			
	8800	ATHN	20 GRF	0936.1	0952.3	29.1	94.4	56.6		
	9100	ARCE	24	0951.8		50				
	9100	ARCE	20	1112.7	1201.7	200				
	1420	ARCE	1	1201.1	1201.3	.8				
	536	ONDR	45 C	1218.8	1222.6	7	41	18.6		
	808	ONDR	4 S/F	1221	1222.5	2.5	28	14		
	2800	OTTA	1 S	1826	1828	7	1	.5		
	4995	BCUL	8 S	2032	2033	1.5	16	5		
	2695	BCUL	3 S	2038.5	2039.5	1.5	3	1		
	2695	PENT	1 S	2140	2141	2	6.6	3.3		
	1420	BCUL	2 SF	2140	2140.5	2	2	1		
	2695	BCUL	3 S	2141.5	2142	2.5	6	2		
	18	MCMA	6 S	2225	2226	?			1	
	208	VORO	44 NS	2300	0429	360	25	11		
26	1415	MANI	3 S	0157.5	0203	14.5	10.3	3.9		
	3750	TYKW	45 C	0157	0202.9	15	13	4		085099F
	2800	TYKW	45 C	0157	0203.2	15	10	3		40R
	1800	TYKW	45 C	0157	0200.7	15	35	8		40R
	500	HIRA	45 C	0158.6	0203.7	19	35	10		WL
	2695	MANI	1 S	0159	0204	11.8	6.7	2.7		
	4995	MANI	3 S	0159.2	0204	10.3	16.9	5.6		
	8800	MANI	3 S	0159.9U	0203.3	10.3U	18.8	6.2		
	200	HIRA	45 C	0202	0206.5	22	500	40		WL
	9400	TYKW	5 S	0202	0202.9	10	15	4		OR
	100	HIRA	27 RF	0213	0221	38	50	10		WL
	3750	TYKW	5 S	0219.5	0220.7	3	4	1.5		085099F
	200	HIRA	45 C	0428.3	0429.5	3.5	700	100		WL
	100	HIRA	45 C	0429	0430	1.5	850	300		WL
	100	HIRA	45 C	0429	0430	1.5	850	300		WL
	3750	TYKW	5 S	0452.5	0453.4	2	4	1		
	202	IZMI	44 NS	0700		300	30			
	127	TORN	44 NS	0730 E		270 U				
	33	UPIC	43 NS	0820.7		317				
	29	UPIC	43 NS	0821.5		316.5				
	245	SGMR	43 NS	1305 E	1943.8	487 D	310.8			3S,5
	3100	CRIM	20 GRF	0711	0749	96	5	2		
	202	IZMI	5 S	0725.5	0725.5	1.5	100	58		
	3100	CRIM	1 S	0736	0739	6	3	1		
	113	POTS	45 C	0744.5	0744.6	.1	280	70		
	930	BORO	41 F	0821.4	0821.6	.3	66	2		
	113	POTS	41	0932.6	0939.7	8.5	1400	6		
	930	BORO	8 S	0949.6	0949.6	.1	11	1		
	113	POTS	41	1121.7	1124.2	14	550	1		
	1470	BERL	4 S/F	1203	1204	1.5	12			
	113	POTS	45 C	1203.5	1203.6	7.3	5000	30		
	3000	BERL	1 S	1203.6	1203.6	.2	2.5			
	113	POTS	45 C	1224	1224.4	.5	300	10		
	113	POTS	45 C	1252.7	1252.7	.8	5000	700		
	113	POTS	41	1313.7	1317.8	4.2	5000	80		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
	113	POTS	45 C	1333.4	1333.5	1.9	350	3		
	2800	OTTA	20 GRF	1525	1550	60	1	.5		
	2800	OTTA	240 R	1635	1650	15	1	.5		
	2800	OTTA	23 GRF	1625		130 D	4.8			
	2695	SGMR	46 C	1833.6	1859.9	38.6	58.2	17.5		SWF
	2695	SGMR	46 C	1833.6	1905.9		29			SWF
	606	SGMR	47 GB	1842.7	1859.8	23.6	3640	1092		SWF
	9400	HUAN	20 GRF	1847	2004.1	77.1	13.3	3.2		
	8800	SGMR	4 S/F	1850.2	1900	46.6	50	15		SWF
	4995	SGMR	4 S/F	1851.5	1859.9	46.8	94.6	28.4		SWF
	1420	BOUL	4 SF	1854.5	1859.5	19	34	11		
	1415	SGMR	4 S/F	1855.8	1859.8	8	42	12.6		SWF
	15400	SGMR	4 S/F	1855.8	1900	35.9	26.2	7.9		SWF
	245	SGMR	6 S	1855.8	1859.5	8.7	11	3.3		SWF
	2800	OTTA	4 S/F	1855.8	1859.9	17	46	10.2		
	4995	BOUL	4 SF	1855	1859	14	75	25		
	410	SGMR	6 S	1856	1900.3	15.6	166.5	50		SWF
	2695	BOUL	45 C	1856	1900.5	10.5	43	14		
	9400	HUAN	3 S	1858.4	1902.2	3.8	51.6	26.3		
	9400	HUAN	3 S	1858.4	1902.2	3.8	51.6	26.3		
	4995	BOUL	45 C	2036	2038	4	19	6		
	2695	BOUL	45 C	2037.5	2039	2.5	4	1		
	2000	TYKW	5 S	2326	2327	3	1.5	.5		OR
	3750	TYKW	45 C	2325	2326.9	7	17	6		
	3750	TYKW	30 PBI	2332		110	5	2.5		
	9400	TYKW	45 C	2326	2327	6	43	18		OR
	1000	TYKW	5 S	2326.6	2326.9	.5	1.2	.3		
	9400	TYKW	29 PBI	2332		90	14	6		
	2695	MANI	1 S	2326.4	2327.3	1.6	4.1	1.4		
	4995	MANI	1 S	2326.4	2326.8	1.1	9	3		
	8800	MANI	1 S	2326.5	2327	2	5.6	2.2		I
	100	HIRA	45 C	2336.5	2337.8	3	1200	150		WL
	3750	TYKW	45 C	2336	2337.5	15	3	1		
	2000	TYKW	45 C	2336.5	2337.8	2.5	2.3	.5		
	1000	TYKW	45 C	2336.5	2337.8	1.5	5	.5		
27	3750	TYKW	5 S	0021	0022	8	1.2	.5		
	3750	TYKW	5 S	0059	0059.4	1	1	.3		
	2000	TYKW	5 S	0059	0059.4	1	1.2	.3		
	3750	TYKW	21 GRF	0140	0310	290	5	2		
	8800	MANI	3 S	0307 U	0313.1	10 U	20.2	6.7		
	4995	MANI	3 S	0307.3U	0313	9.7U	20.6	6.8		
	3750	TYKW	45 C	0311	0312.4	2	81	18		10L
	3750	TYKW	29 PBI	0333		25	5	2		085097F
	2000	TYKW	5 S	0312	0312.4	4	48	10		10R
	2000	TYKW	29 PBI	0316		18	2.3	1.4		
	1000	TYKW	5 S	0312	0312.5	8	18	3		07R
	500	HIRA	45 C	0312	0312.2	1.7	15	5		WL
	9400	TYKW	5 S	0312	0312.3	1	16	5		0L
	1415	MANI	3 S	0312.5	0312.9	5.5	51.8	19.5		
	606	MANI	3 S	0312.7	0312.9	.6	135.5	13.6		
	2695	MANI	3 S	0312.7	0312.9	4.3	62.1	20.7		
	3750	TYKW	5 S	0343	0343.2	3	1.5	.5		265092F
	9400	TYKW	5 S	0352.7	0353.1	1.5	12	3		265092F
	3750	TYKW	21 GRF	0434	0450	50	2.5	1		
	9400	TYKW	20 GRF	0435	0443	50	5	2		
	1000	TYKW	45 C	0440	0441.8	3	1.6	.3		
	3750	TYKW	45 C	0441	0442.1	6	9	3		085097F
	2000	TYKW	45 C	0441	0442.1	3	11	3		OR
	1415	MANI	1 S	0441	0441.8	2.5	2.8	1.1		
	4995	MANI	1 S	0441.5	0442.5	2.5	8.8	2.9		
	2695	MANI	3 S	0441.5	0442.3	2.5	12.4	4.1		
	6100	KISV	21 GRF	0640	0706	50	7			
	606	MANI	40 F	0827	0856	45 U	97.6	40		
	8800	MANI	47 GB	0856.7	0856.9	.6	2500	800		
	237	TRST	5 S	0912.7	0912.7	.1	320	100		3L
	260	ONDR	49 GB	0945	1134.2	135	89	27		
	237	TRST	41 F	1008.6	1008.6	.1	120			6L
	9100	ARCE	28	1013		34.9				
	202	IZMI	41 F	1019.5	1021.7	16.5	38			
	127	TORN	27 RF	1026	1129.5U	154 D	13			
	650	GORK	23 GRF	1027		93				
	808	ONDR	49 GB	1040	1130	70	470	161		
	6100	KISV	45 C	1046	1110	24	102			
	9100	GORK	21 GRF	1046.5	1115	55	36	15		
	1415	ATHN	47 GB	1046.9	1111.2	71	92.6	27.8		
	1415	ATHN	47 GB	1046.9	1129.5		1604	481.2		
	1420	ARCE	28	1047.2	1110.8	39.1				
	4995	ATHN	46 C	1047.3	1055.8	70.6	66.9	20.1		
	4995	ATHN	46 C	1047.3	1110.6		138.3	41.5		
	9100	ARCE	45	1047.9	1110.5	37.7				
	9100	ARCE		1047.9	1055.8	12.5				
	2950	GORK	21 GRF	1048		103				
	3100	CRIM	47 GB	1048	1110	132 D	156			
	3100	CRIM		1048	1129		312	104		
	3100	CRIM		1048	1132.5		312	104		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	8800	ATHN	46 C	1048.6	1055.9	37.1	53	15.9		
	8800	ATHN	46 C	1048.6	1110.6		112.5	33.8		
	15000	KISV	45 C	1050	1110	40	74			
	9500	BERL	45	1050	1110	106 D	79			
	536	CNOR	49 GB	1050	1133.1	70	98	42		
	1470	BERL	45	1052	1128	88 D	1250			
	930	BORC	PRE	1053	1123	35	64	21		
	2950	GORK	3 S	1053	1055.8	7	28	14		
	9100	GORK	4 SF	1053.5	1055.5	4.3	32	11		
	950	GORK	1 S	1053.5	1054	3.8	5.5			
	408	TRST	7 C	1053.6	1053.9	.7	39			
	408	TRST		1054.3	1130.3		81			
	408	TRST		1054.3	1105.2		100			
	408	TRST	49 GB	1054.3	1054.4	63	100			
	237	TRST	47 GB	1054.7	1120.6	74.5	130			73L
	234	POTS	45 C	1054	1105	126	70			
	127	TORN	45 C	1057.5U	1110.3	15	24			
	113	POTS	45 C	1057	1100	123	200			
	1470	BERL	4	1057	1111		111			
	3000	BERL	4	1057	1129		434			
	1470	BERL	4	1057	1139		196			
	3000	BERL	4	1057	1143		196			
	1470	BERL	4	1057	1134		425			
	3000	BERL	4	1057	1133		423			
	3000	BERL	45	1057	1110	80 D	486			
	100	GORK		1059.5		61 U	10 D			
	9100	ARCE		1100.4	1110.5	25.2				
	33	UPIC	49 GB	1100.4	1103.4	29.2				
	29	UPIC	49 GB	1100.7	1120	29				
	202	IZMI	25 R	1102	1143.7	58	90	30		
	2950	GORK	46 C	1103 U	1108	33	97			
	2950	GORK		1103 U	1111.5		112			
	2950	GORK		1103 U	1130		376			
	950	GORK	46 C	1104	1110.8	64.5	40			
	950	GORK		1104	1130.2		380			
	950	GORK		1104	1139.8		360			
	9400	HUAN	45 C	1104.7	1136.2	31.5	86.5	30		
	9100	GORK	4 SF	1105	1110.6	13	82	41		
	650	GORK	45 C	1106.4	1108	6	25			
	650	GORK		1106.4	1110.5		37			
	9180	ARCE	29	1125.6		74				
	1420	ARCE	47	1126.3	1128	8.6				
	1420	ARCE		1126.3	1128	2.7				
	650	GORK	45 C	1127	1130.8	24	160			
	650	GORK		1127	1133.4		135			
	650	GORK		1127	1136.4		140			
	650	GORK		1127	1139.8		170			
	930	BORD	47 GB	1128	1140	20	662	270		
	930	BORD		1128	1130.5		480			
	930	BORC		1128	1132		431			
	930	BORD		1128	1135		480			
	930	BORD		1128	1144.5		304			
	930	BORD	PBI	1128	1148	18	49	10		
	1420	ARCE		1129	1129.3	.8				
	1420	ARCE		1129.8	1130.6	1.8				
	1420	ARCE		1131.6	1133.9	3.3				
	1420	ARCE	30	1134.9	1136.2	127				
	1420	ARCE	40	1138.9	1139.8	4.5				
	240	DWIN	49 GB	1139 E	1141	35 D	90			
	160	DWIN	49 GB	1139 E	1143	40 D	60			
	2800	OTTA	22 GRF	1425	1440	30	1.8	.9		
	2800	OTTA	1 S	1510	1517	10	1	.5		
	2800	OTTA	22 GRF	1530	1540	30	1	.7		
	2800	OTTA	20 GRF	1610	1620	40	1.6	1		
	2800	OTTA	22 GRF	1840	1844	23	1.8	.9		
	2800	OTTA	22 GRF	1915	1942	40	2.2	1.1		
28	3750	TYKW	45 C	0041	0058	35	2	1		
	9400	TYKW	5 S	0100	0104	25	6	2		
	3750	TYKW	5 S	0218	0221	6	10	5		086090F
	3750	TYKW	29 PBI	0224		45	4	1.5		
	9400	TYKW	5 S	0219	0221	13	11	3		40R
	5730	IRKU	1 S	0219.5	0221	5	15			L
	2000	TYKW	5 S	0220	0221	15	3.5	1		0L
	3750	TYKW	45 C	0523	0524.7	12	3.5	1		
	100	HIRA	45 C	0634	0635.3	4	850	150		MR
	200	HIRA	45 C	0635	0636	4	150	15		MR
	100	GORK	45 C	0752.3		3.4	15 D			
	113	POTS	3 S	0752.8	0754.5	1.8	140	10		
	237	TRST	41 F	0822.6	0822.8	.4	67			12L
	113	POTS	45 C	0829.5	0829.8	.5	400	30		
	260	ONDR	44 NS	0840 E		272 D	91			
	127	TORN	43 NS	0940 U	1221	260 D	50			
	240	DWIN	44 NS	1000 E		250 D		5		
	160	DWIN	44 NS	1000 E		250 D		10		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	245	SGMR	44	NS	1218 E	1307.2	534 D	35			3,5
	3100	GRIM	47	CB	0848	0952	252 D	150	50		
	3000	BERL	21	GRF	0848	0945	147	27			
	1470	BERL	21	GRF	0848	0947	95	5.6			
	9500	BERL	21	GRF	0850	0957	135	20			
	6100	KISV	45	C	0855	0952	85	156			
	9100	GORK	21	GRF	0856.1	0954.4	111	34			
	2695	ATHN	20	GRF	0856.5	0952.2	85.1	139.8	83.9		
	4995	ATHN	20	GRF	0856.6	0952	88	166.9	100.2		
	8800	ATHN	20	GRF	0858.4	0952.1	87.5	155	93		
	9100	ARCE	28		0918.9	0936.6	22.5				
	1420	ARCE	28		0921.5	0935.7	19.5				
	2950	GORK	45	C	0923.2	0952.5	53	70			
	2950	GORK			0923.2	1008.8		200			
	2950	GORK	29	PBI	0923.2	1016	25.8	26			
	650	GORK	20	GRF	0930		75				
	1470	BERL	4	S/F	0932	0935	8.5	24			
	3000	BERL	4	S/F	0932	0934	8.5	53			
	100	GORK	46	C	0933		62	10 D			
	100	GORK	46	C	0933		62	10 D			
	930	BORD	40	F	0933	0952	49	18	8		
	930	BORD			0933	1008.3		42			
	1415	ATHN	20	GRF	0933.1	1002.8	46.1	97.8	58.7		
	950	GORK	45	C	0933.4	0952.9	40	21			
	950	GORK			0933.4	1005.1		19			
	950	GORK			0933.4	1008.7		30			
	536	ONDR	46	C	0933.5	1010.8	48	25	5.8		
	9500	BERL	2	S/F	0933	0936	6	17			
	100	GORK	46	C	0934.3	0935.2	4.9	16			
	100	GORK			0934.3	0937		20			
	9100	ARCE	46		0941.4	0952.2	36.9				
	9100	ARCE			0941.4	0952.2	21.1				
	100	GORK	46	C	0941.7	0949.6	12.6	53			
	100	GORK			0941.7	0952.6		73			
	1420	ARCE	46		0941	1004.5	40.8				
	1420	ARCE			0941	0952.1	20.9				
	1470	BERL	4	S/F	0941	0952	21	81			
	3000	BERL	3	S	0941	0951	21	159			
	9500	BERL	4	S/F	0941	0951	20	96			
	650	GORK	2	SF	0947.1	0947.5	.8	15	7.5		
	888	ONDR	46	C	0950	1007.2	25	200	72		
	1420	ARCE			1001.9	1004.5	4.1				
	1470	BERL	4	S/F	1001	1008	20	101			
	3000	BERL	3	S	1001	1006	22	160			
	9100	ARCE			1002.5	1008.4	15.8				
	9500	BERL	4	S/F	1002	1007	18	65			
	100	GORK	46	C	1004	1006	7.2	17.8			
	100	GORK			1004	1008.8		57			
	650	GORK	46	C	1004.3	1005.3	8	25			
	650	GORK			1004.3	1009.1		35			
	650	GORK			1004.3	1012		34			
	1420	ARCE			1006	1008.2	15.8				
	9100	ARCE	29		1018.3		32				
	29	UPIC	4	S/F	1107.8	1108.7	1.3				
	33	UPIC	4	S/F	1108.1	1108.4	1.1				
	33	UPIC	2	S/F	1120.7	1120.9	1.1				
	29	UPIC	2	S/F	1120.8	1120.9	1.2				
	930	BORD	41	F	1136.6	1136.7	.1	41			
	33	UPIC	3	S	1306.6	1306.8	.5				
	237	TRST	41	F	1306.7	1306.7	.2	150			8L
	29	UPIC	8	S	1306.8	1307	.6				
	237	TRST	41	F	1344.1	1344.2	.2	160			23L
	113	POTS	1	S	1344.1	1344.2	.1	3500	1200		
	245	SGMR	6	S	1344.2	1344.3	.2	184	73.8		5
	2800	OTTA	20	GRF	1425	1615	125	2.6	1.3		
	930	BORD	41	F	1508	1508.1	.3	51	2		
	930	BORD	3	S	1559.3	1559.4	.2	19	2		
	2800	OTTA	20	GRF	1718	1725	15	1	.5		
	2800	OTTA	2	S/F	1735.9	1736	2.6	2.8	1.6		
	2800	OTTA	29	PBI	1738.5	1738.5	15	1	.5		
	245	SGMR	6	S	1738.1	1738.9	1.2	85.1	25.5		5
	2800	OTTA	20	GRF	1825	1915	85	1.4	.7		
	4995	BOUL	1	S	2144.5	2145.5	1.5	6	2		
	1420	BOUL	1	S	2144	2144.5	2	1			
	2695	BOUL	1	S	2145	2146	1.5	3	1		
29	3750	TYKW	5	S	0006	0008.7	7	1.5	.5		
	3750	TYKW	20	GRF	0027	0110	160	5	2.5		
	9400	TYKW	20	GRF	0030	0100	90	6	3		0R
	2000	TYKW	20	GRF	0030	0110	120	1.5	.7		0L
	6100	KISV	45	C	0630	0644	28	5			
	6100	KISV	1	S	0725	0726	4	2			
	6100	KISV	1	S	0733	0734	6	3			
	6100	KISV	21	GRF	0800	0806	30	8			
	260	ONDR	44	NS	0820 E		310 D	30			

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	100	GORK	43 NS	0912		138		10		
	127	TCRN	43 NS	0913	0946.6	287 D	30			
	245	SGMR	43 NS	1335	1924.8	458 D	38.8			
	9100	GORK	23 GRF	0857	0904.5	165	15	7		
	3100	CRIM	7 C	0858	0950	102 U	11	4		
	9500	BERL	1 S	0858.1	0859.2	1.7	12			
	8800	ATHN	20 GRF	0858.3	0901.4	21.4	14.3	8.6		
	9100	GORK	1 S	0858.5	0859	1	9.5	5		
	4995	ATHN	20 GRF	0859	0904.8	29	11.3	6.8		
	3000	BERL	2 S/F	0900.7	0904.2	5	8			
	1470	BERL	2 S/F	0900.9	0904.4	5	1.2			
	2950	GORK		0907.3U	0908.5	17 U				
	6100	KISV	21 GRF	0914	0918	22	8			
	9100	ARCE	21	0917.3	1055.6	180				
	8800	ATHN	20 GRF	0946.7	0950.9	18.7	14.3	8.6		
	2695	ATHN	20 GRF	0946.8	0950.3	10	12.1	7.3		
	4995	ATHN	3 S	0948	0950.8	10.5	11.3	3.4		
	2950	GORK	20 GRF	0948	0950.8	12	11			
	1420	ARCE	8	0950.1	0950.2	.5				
	3000	BERL	2 S/F	0950.1	0950.9	5	8.7			
	1470	BERL	1 S	0950.1	0950.5	.6	6.7			
	9500	BERL	2 S/F	0950.2	0951	1.8	6.7			
	6100	KISV	21 GRF	1027	1030	16	5			
	9500	BERL	3 S	1035	1035.2	.7	13			
	8800	ATHN	3 S	1052	1055.4	8.2	18.1	5.4		
	3100	CRIM	20 CRF	1054	1056	20	5	2		
	6100	KISV	21 GRF	1054	1056	11	7			
	4995	ATHN	20 GRF	1054.1	1055.6	13.2	9.2	5.5		
	9100	GORK	1 S	1054.8	1055.4	1.2	7	3.5		
	2695	ATHN	20 GRF	1055.2	1055.7	0.6	3.6	2.2		
	2695	ATHN	20 GRF	1133.4	1140.2	10.8	18.1	10.8		
	6100	KISV	45 C	1135	1140	22	20			
	1415	ATHN	20 GRF	1135.2	1145	14.5	9.5	5.7		
	8800	ATHN	3 S	1136.5	1140.8	9.3	45.3	13.6		
	9100	GORK	2 SF	1137.9	1140	4.1	35	10		
	4995	ATHN	3 S	1138.7	1140.2	17.6	28.8	6.2		
	3100	CRIM	3 S	1139	1140	10	8	3		
	9500	BERL	4 S/F	1139	1140.2	3	20			
	9400	HUAN	2 S/F	1139.1	1142	2.9	31.1	14.5		
	3000	BERL	4 S/F	1139.2	1140.1	2.6	9.2			
	1470	BERL	2 S/F	1139.2	1140.4	2.6	2.4			
	1420	ARCE	4	1139.2	1139.6	3				
	9100	ARCE	3	1139.4	1140.1	2.6				
	930	BORC	8 S	1141.3	1141.3	.1	17	2		
	408	TRST	7 C	1223.7	1223.8	.3	41			
	9100	ARCE	2	1415.9	1416.3	.8				
	2800	OTTA	21 GRF	1423	1430	20	2	1.2		
	2800	OTTA	40 F	1424.9	1426	2	13.6			
	2800	OTTA	240 R	1530	1540	10	1.4	.7		
	2800	OTTA	22 GRF	1550	1640	125	4.6	2.3		
	4995	BOUL	3 S	2237.5	2239.5	2	15	5		
	1420	BOUL	3 S	2238	2239	2	2	1		
	2695	BOUL	3 S	2239	2240.5	1.5	5	2		
30	2930	VORO	3 S	0405	0407	5	170			
	2695	MANI	4 S/F	0408	0409.7	10.5	385.4	116.2		
	1415	MANI	4 S/F	0408	0410.3	10.5	202.5	54		
	3750	TYKW	45 C	0408	0410.1	9	290	50		10L,087064F
	3750	TYKW	29 PBI	0417		100	5	2		
	2088	TYKW	45 C	0408	0410.2	9	295	40		04R
	2800	TYKW	29 PBI	0417		100	8	2.5		
	1888	TYKW	45 C	0408	0410.3	20	335	30		06R
	500	HIRA	45 C	0408.1	0409.3	20	800	30		MR
	9400	TYKW	45 C	0408.9	0410.1	8.5	298	40		05R
	9400	TYKW	29 PBI	0417		60	5	2		
	5730	IRKU	45 C	0408.6	0409.4	17	170			L
	5730	IRKU		0408.6	0409.7U		200 U			L
	4995	MANI	4 S/F	0408.8	0410.3	4.2	230.5	92.2		
	8800	MANI	4 S/F	0409	0410.3	3.5	293.5	128.7		
	606	MANI	4 S/F	0410.5E	0411.9	4.5D	66.4D	24.3D		ON DRIFT
	298	VORO	4 S/F	0411	0412	3	38			
	200	HIRA	45 C	0412.2	0413	1.5	90	20		O
	100	HIRA	45 C	0412.2	0413	4	700	50		ML
	3100	CRIM	20 CRF	0600 D	0638	97 U	5	2		
	202	IZMI	5 S	0808.3	0808.4	.5	42	16		
	250	ONDR	44 NS	0820 E		324 D	19			
	6100	KISV	20 GRF	0922	0934	30	3			
	3100	CRIM	3 S	0922	0930	23	4	1		
	9100	ARCE	24	0948.4		17				
	6100	KISV	21 GRF	1020	1022	4	8 D			
	3100	CRIM	3 S	1021	1022 D	5	9	3		
	1470	BERL	4 S/F	1021.2	1022	4	11			
	888	ONDR	4 S/F	1021.2	1022.4	3	33	11.7		
	9500	BERL	4 S/F	1021.3	1022	2.5	35			
	3000	BERL	4 S/F	1021.5	1022	3.4	23			

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	536	ONDR	4	S/F	1021.5	1023	2.5	38	5.6		
	1420	ARCE	45		1021.5	1022.2	4				
	1420	ARCE			1021.5	1022.2	1				
	930	BORO	3	S	1021.6	1022.5	2.6	15	3		
	9100	ARCE	45		1021.7	1022.3	2.9				
	9100	ARCE			1021.7	1022.3	1				
	9100	GORK	45	C	1021.8	1022.5	3.8	46	7.9		
	9100	GORK			1021.8	1023.2		29			
	650	GORK	2	SF	1021.9	1022.6	4.4	8			
	950	GORK	3	S	1022	1022.8	3.8	8.8			
	1420	ARCE			1022.5	1022.9	3				
	9100	ARCE			1022.7	1023.1	1.9				
	9100	ARCE	29		1024.6		40.5				
	1420	ARCE	20		1039.5	1059.4	44				
	9100	ARCE	21		1119.1	1130.5	148				
	9100	ARCE	1		1119.4	1119.5	.8				
	2695	ATHN	3	S	1250.5	1254.9	16.2	8.2	2.5		
	4995	ATHN	3	S	1250.5	1254.7	21.1	13.7	4.1		
	9100	ARCE	20		1253.3	1254.9	14				
	1470	BERL	1	S	1253.5	1254.8	2.2	5.2			
	3000	BERL	1	S	1253.5	1254.8	2	9.8			
	9500	BERL	1	S	1253.5	1254.8	4.5	9.5			
	1420	ARCE	1		1254.3	1254.7	3				
	3000	BERL	4	S/F	1301.5	1305.4	13	28			
	2695	ATHN	3	S	1320.2	1325.7	5.6	24.6	7.4		
	2695	SGHR	1	S	1323.6	1325.8	7.4	8.7	4		
	2800	OTTA	4	S/F	1323	1325.5	11	15.8	7		
	4995	ATHN	3	S	1324	1325.7	10	13.7	4.1		
	8800	ATHN	40	F	1324.1	1332.8	12.9	28.7	14.3		
	4995	SGHR	3	S	1325	1325.5	7	13.6	5		
	9100	ARCE	3		1419.8	1419.8	.8				
	9100	ARCE	3		1457.1	1457.2	1				
	245	SGHR	43	NS	1505	1904.6	369 D	26.8			3
	9400	HUAN	1	S	1730	1732.3	2.3	33	8.3		
	2695	PENT	21	GRF	2005	2025	85	3.6	1.8		
	1420	BOUL	3	S	2007.5	2009.5	9.5	5	2		
	2695	PENT	1	S	2007	2009.5	8	4	2		
	2695	BOUL	23	GRF	2008	2010.5	31	6	2		
	2695	PENT	1	S	2022.5	2023	1.5	2	1		
	2695	PENT	1	S	2244.5	2245	1.5	2	1		
	1420	BOUL	8	S	2246.5	2250.5	5.5	10	3		
	3750	TYKW	5	S	2249	2251	6	6	2		
	2695	PENT	2	S/F	2250	2250.8	3	9	4.5		
	2695	BOUL	8	S	2250	2251.5	3	8	3		
	2000	TYKW	5	S	2250	2250.9	2 U	11 U	3 U		18R
	1000	TYKW	5	S	2250	2250.9	2 U	21 U	4 U		
31	3750	TYKW	5	S	0145	0148	8	1.5	.7		
	3750	TYKW	45	C	0227	0228.3	14	4	1		
	2000	TYKW	5	S	0228	0228.4	2	4	1		15R
	1000	TYKW	5	S	0228	0228.4	2	2.6	.7		0R
	3750	TYKW	21	GRF	0310	0455	200	6	3		
	2000	TYKW	21	GRF	0320	0400	190	3.5	2		0L
	3750	TYKW	5	S	0344	0344.7	4	9	2		
	2000	TYKW	5	S	0344	0344.8	2	2.2	.8		0R
	5730	IRKU	1	S	0344.6	0344.7	.8	4			L
	260	ONDR	44	NS	0840 E		300 D	78	6		
	410	SGHR	44	NS	1218 E	1431.9	537 D	15.1			
	245	SGHR	44	NS	1218 E	1257.5	537 D	59.4			
	9100	ARCE	21		0857.5	1015.6	170				
	6100	KISV	3	S	0905	0907	7	7			
	536	ONDR	45	C	0905.3	0907.6	4	188	20		
	1420	ARCE	40		0905.5	0906.9	7				
	930	BORO	41	F	0905.6	0908.4	3.4	58	3		
	650	GORK			0905.8E	0907.8	2.4	150			
	950	GORK			0906.5E	0907.4U	1.7	2.4			
	237	TRST	41	F	0907.1	0907.1	.1	130			0
	408	TRST	7	C	1021.5	1022	1.4	130			
	1420	ARCE	20		1046.9	1102.8	32				
	9100	ARCE	1		1058.1	1058.3	.6				
	9100	ARCE	1		1059	1059.1	.5				
	237	TRST	41	F	1257	1257.5	.7	115			0
	237	TRST	41	F	1308.7	1308.7	.3	70			0
	2800	OTTA	24	R	1500	1535	35	2.4	1.2		
	2800	OTTA	27	RF	1500		200	2.4	2.1		
	2800	OTTA	24P	R	1535		155	2.4			
	2800	OTTA	26	FAL	1810	1820	10	-2.4	-1.2		
	2800	OTTA	20	GRF	1835	1940	90 D	5.4			
	1420	BOUL	8	S	2152.5	2152.5	2	7	2		
	9400	TYKW	20	GRF	2327	2345	120	17	4		0R
	3750	TYKW	21	GRF	2327	2344	120	10	3		
	2000	TYKW	21	GRF	2327	2340	90	3	1		0L
	3750	TYKW	45	C	2331	2331.4	3	10	2		
	2000	TYKW	5	S	2331	2331.5	1.5	6	1.5		0L
	1415	HANI	1	S	2331.4	2331.8	.8	8.1	4		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

DECEMBER 1977

DEC 1977	FREQUENCY STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	2695 MANI	3 S	2331.4	2331.9	.7	14.5	6		
	4995 MANI	1 S	2331.6	2331.8	.5	8.9	4 8		

Reports received from the following observatories:

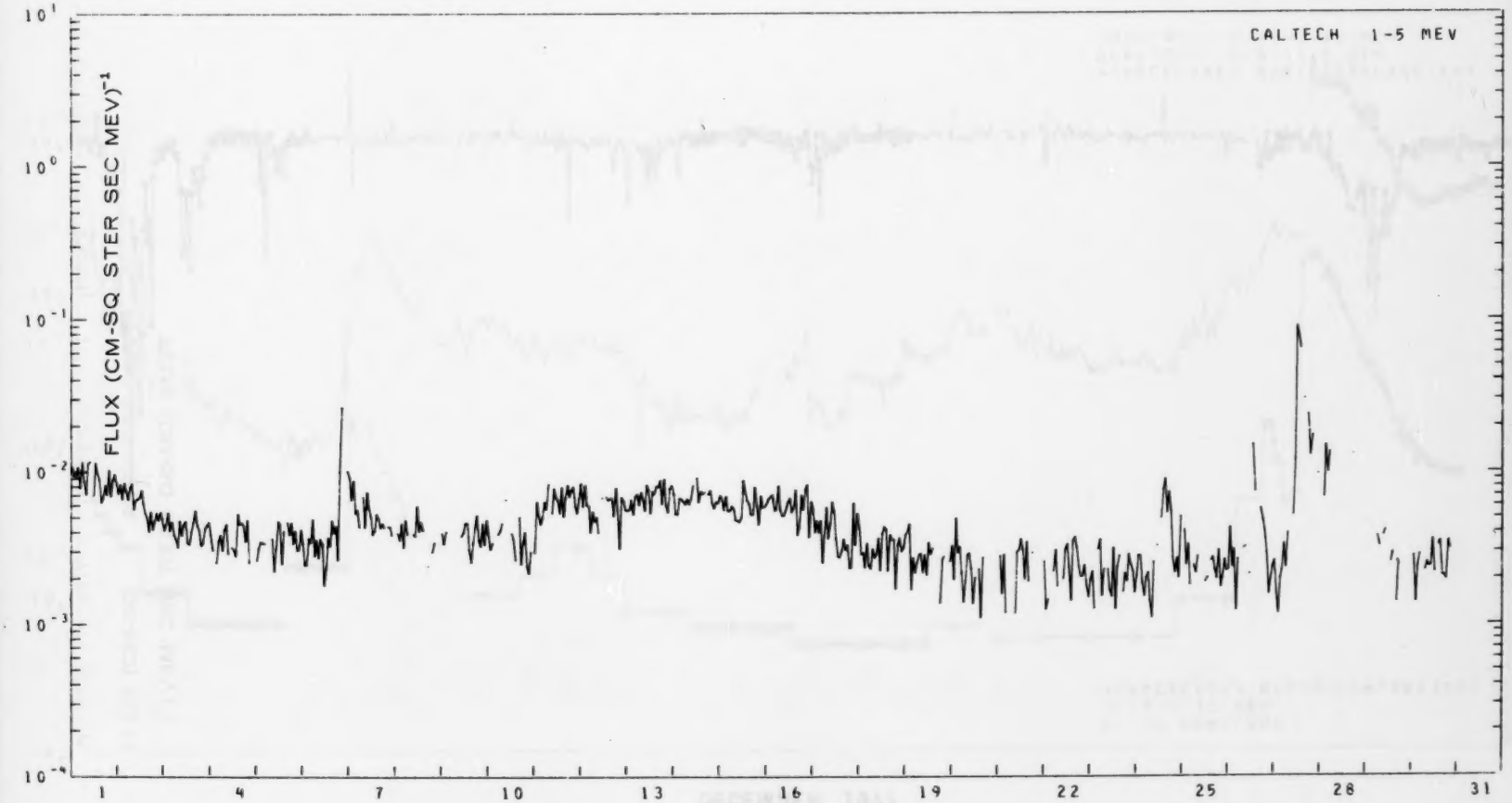
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
NAGO = Nagoya
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

IMP 7 AND 8 ELECTRONS

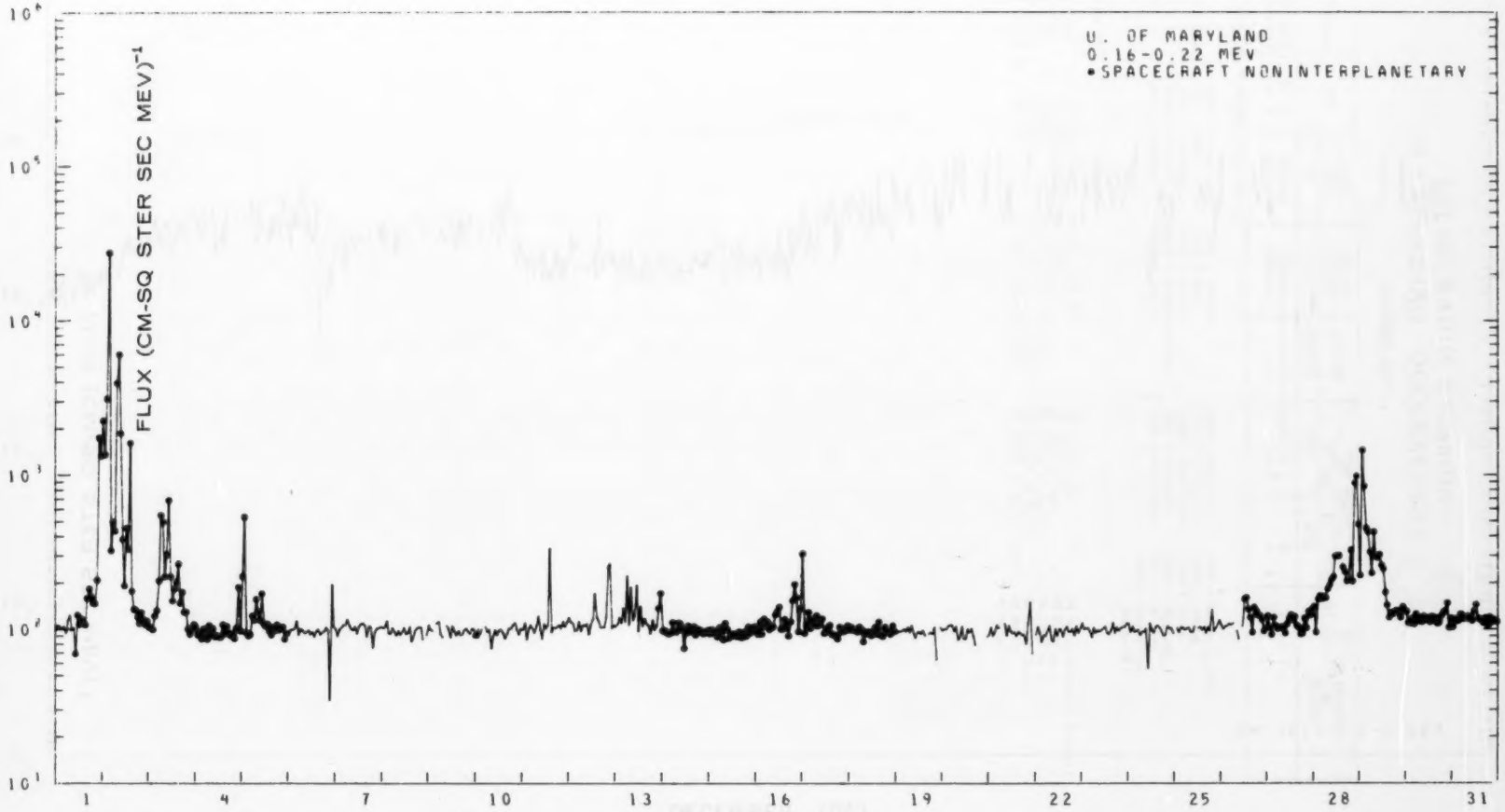
DECEMBER 1977



43
Dec 77

IMP 7 AND 8 LOW ENERGY PROTONS

DECEMBER 1977



IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

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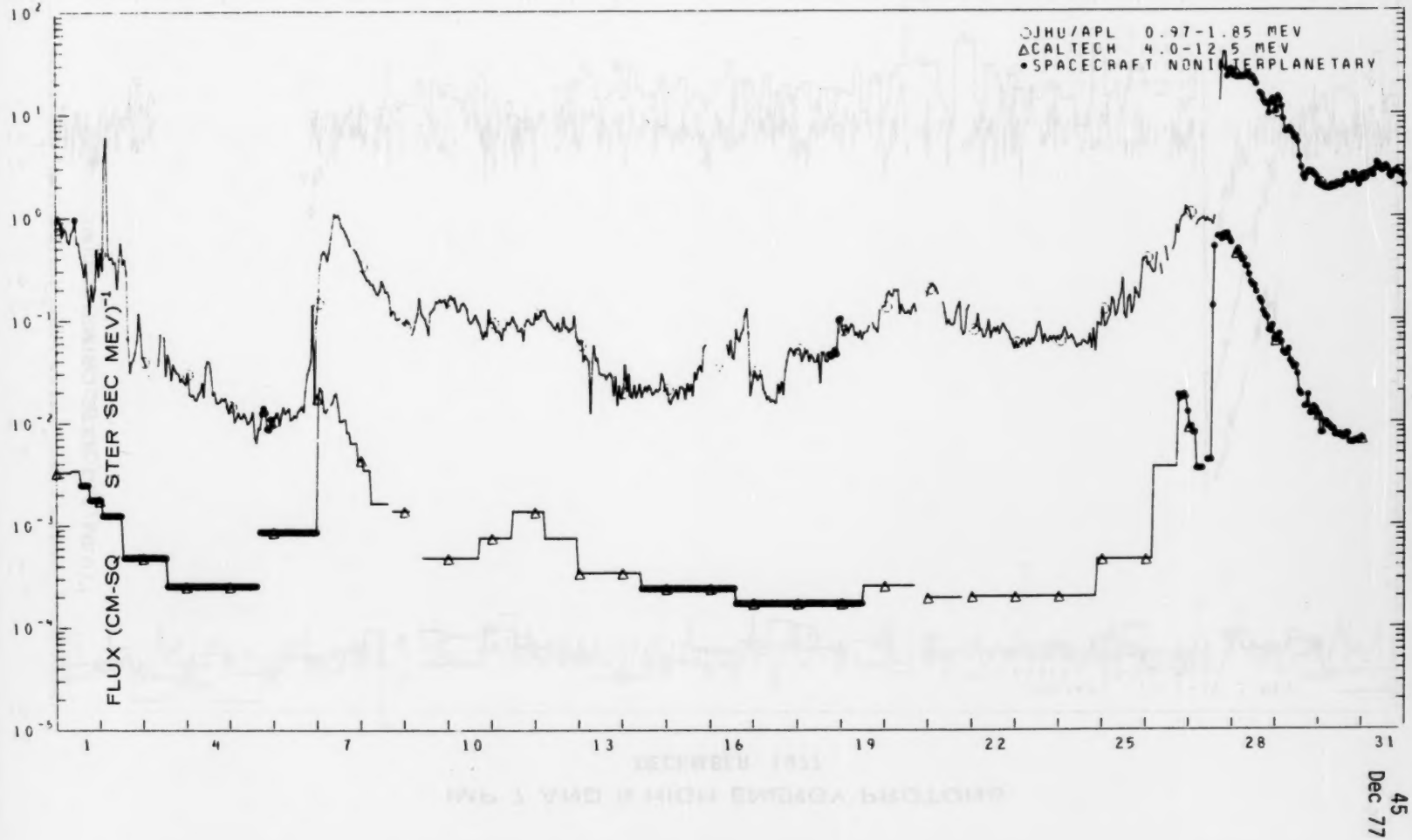
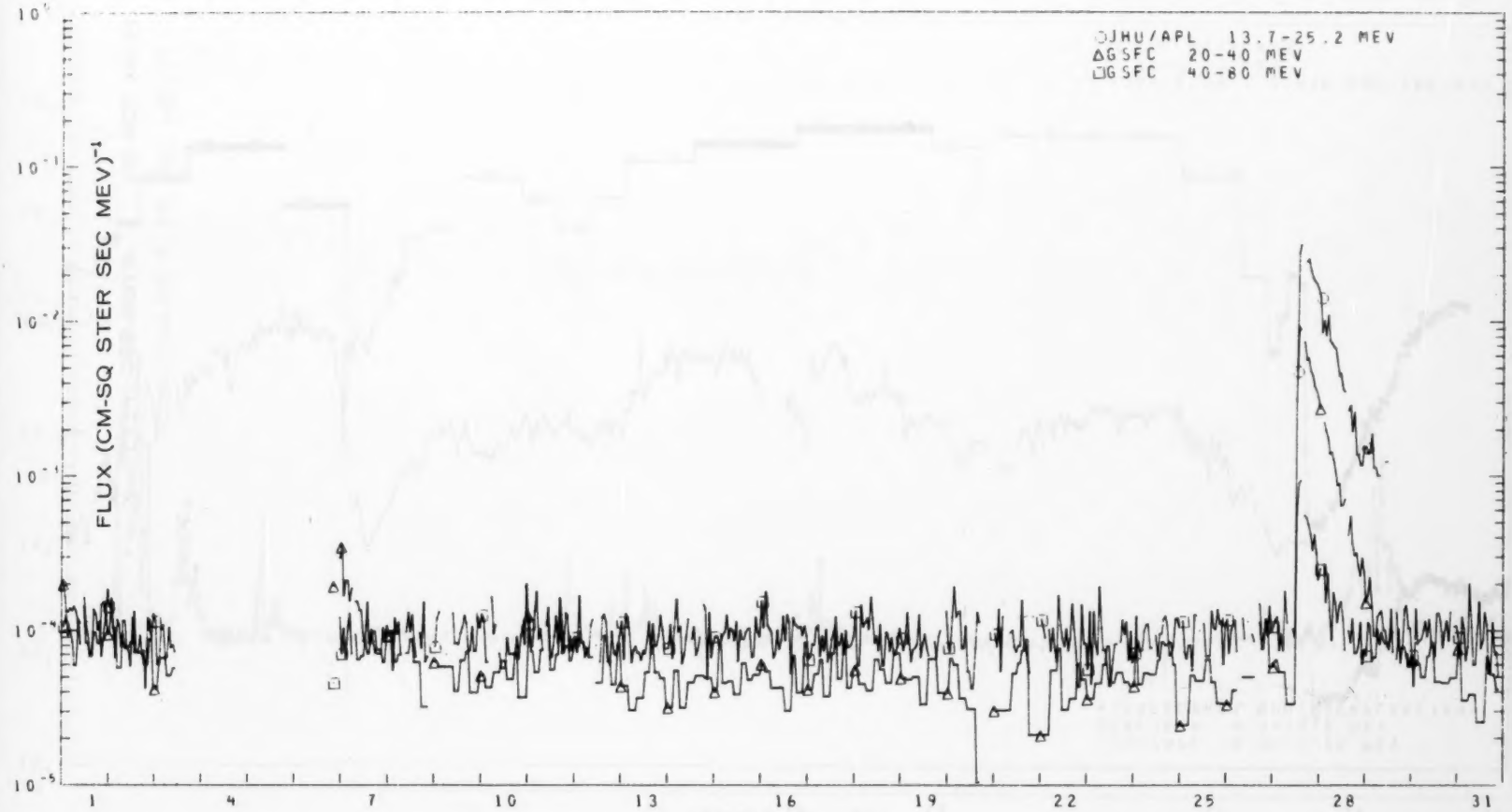


45
Dec 77

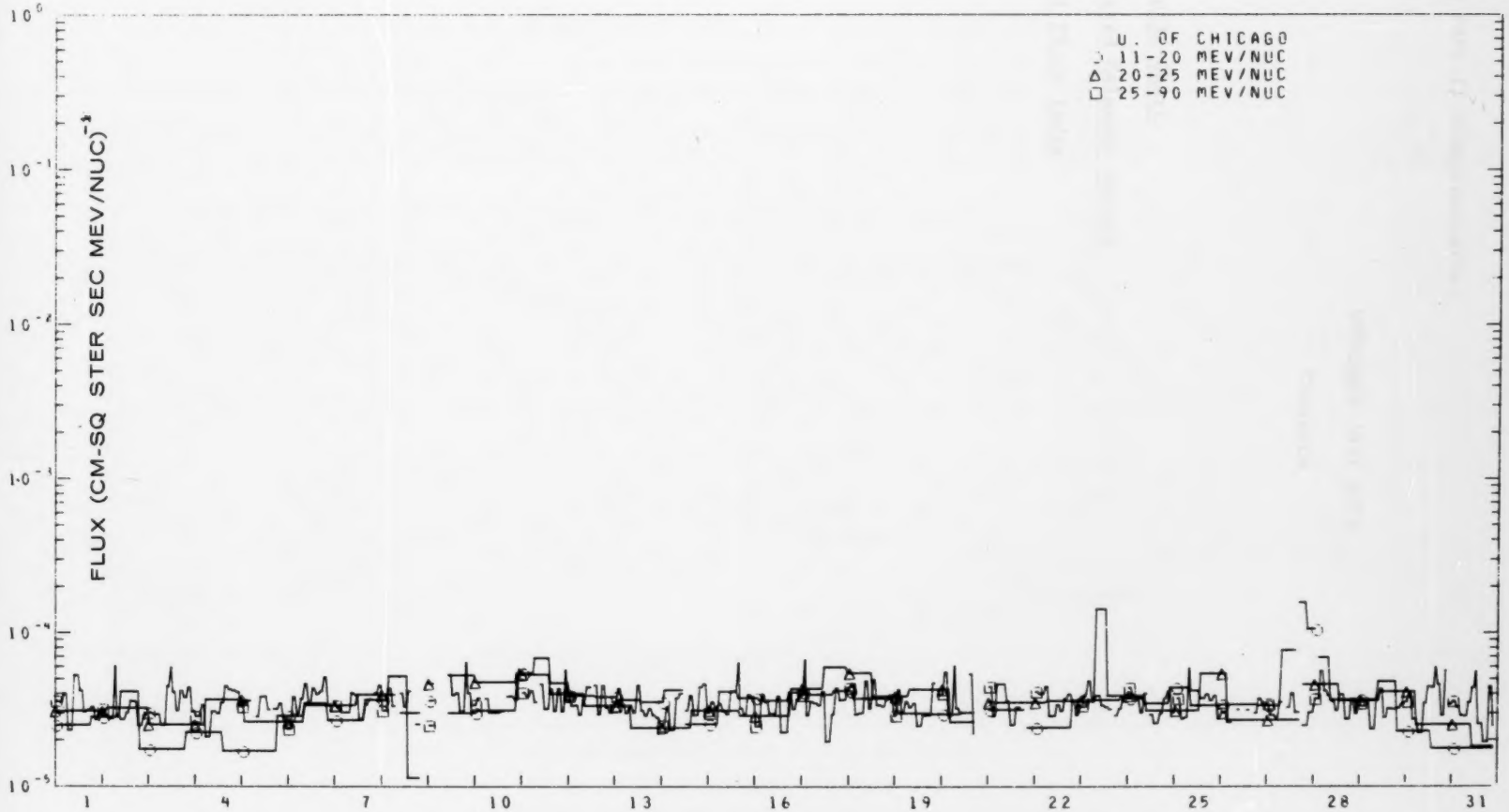
IMP 7 AND 8 HIGH ENERGY PROTONS

DECEMBER 1977



IMP 7 AND 8 ALPHA PARTICLES

DECEMBER 1977



NOVEMBER 1977 DATA

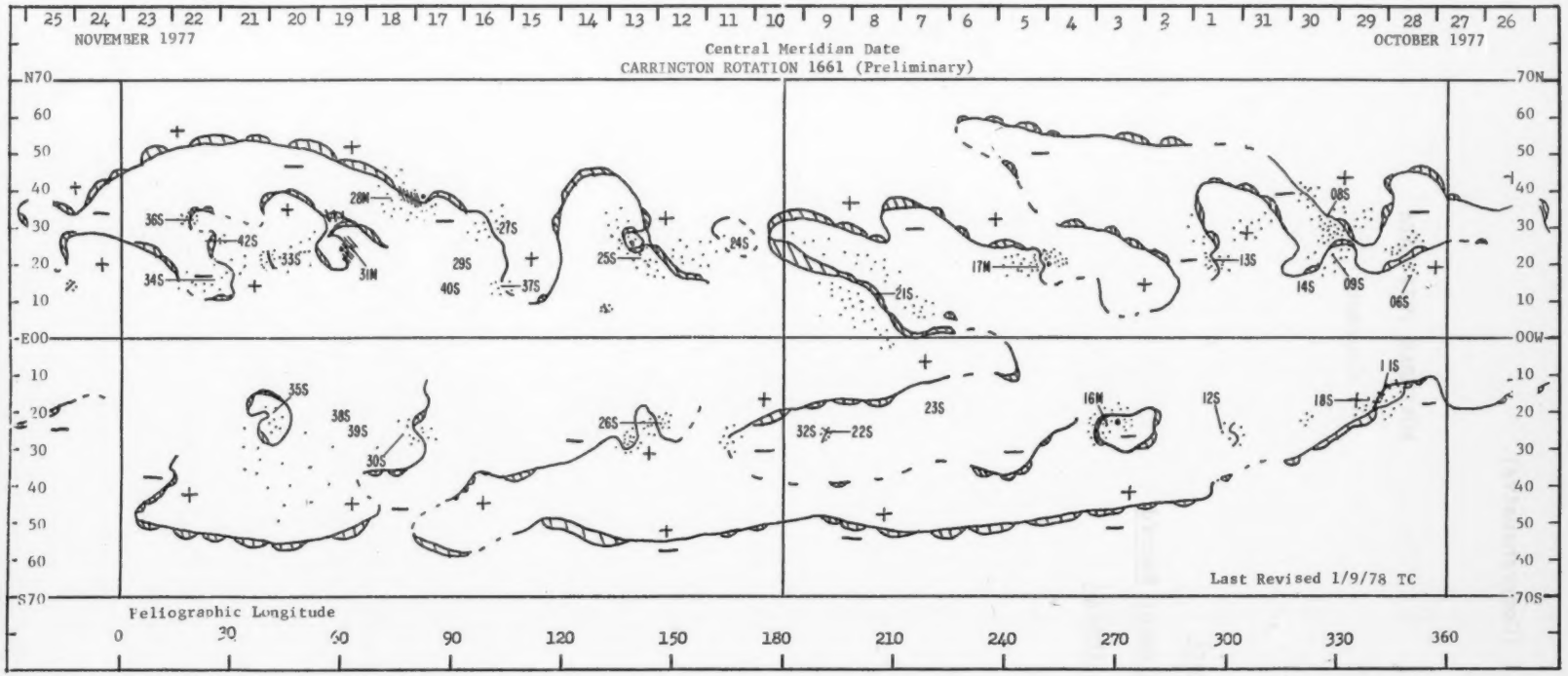
Contents

	Page
Hα Synoptic Chart	50-51
Abbreviated Calendar Record	52-59
Regional Flare Index	59

ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

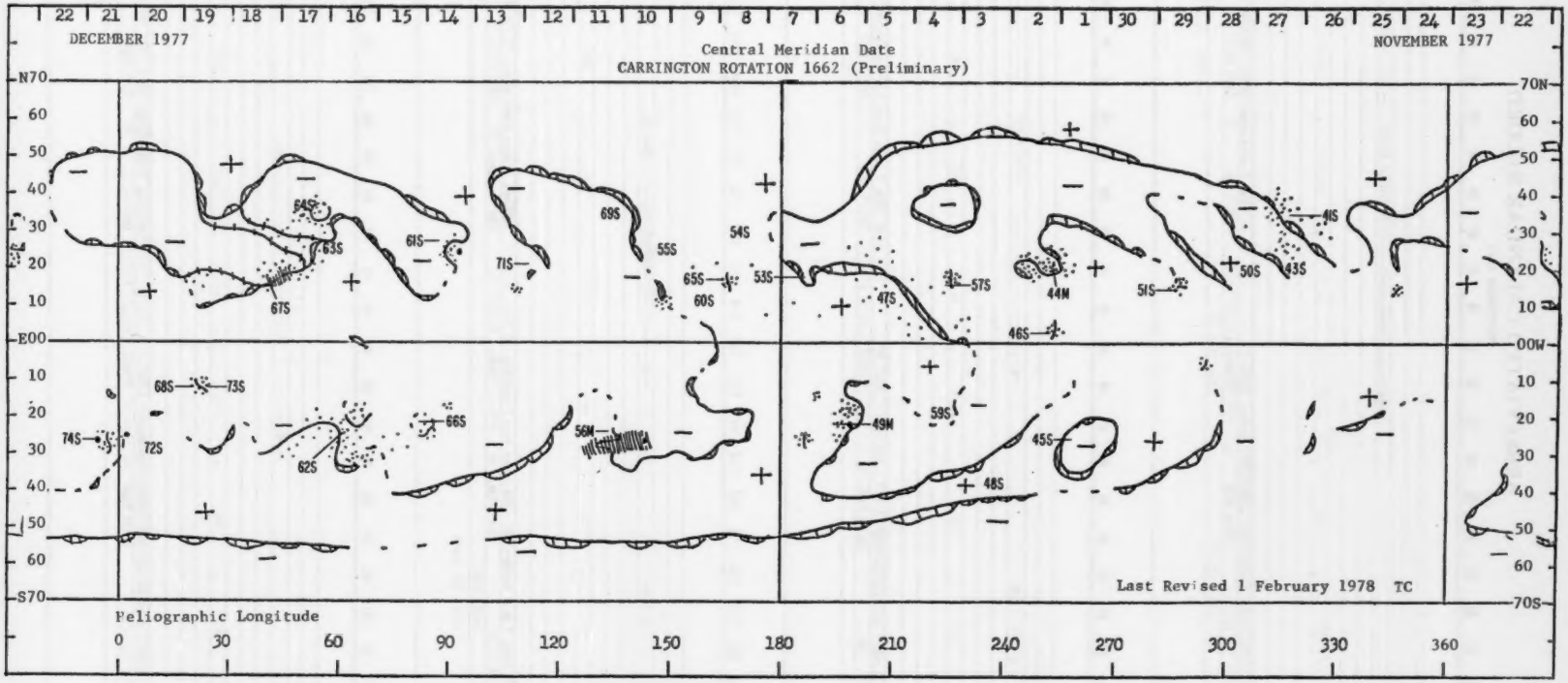
CARRINGTON ROTATION 1661 (PRELIMINARY)



ABBREVIATED CALENDAR RECORD

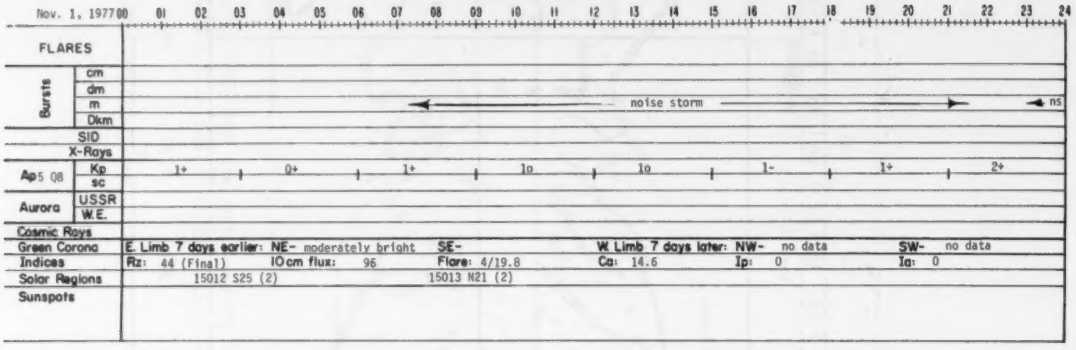
Hα SYNOPTIC CHART

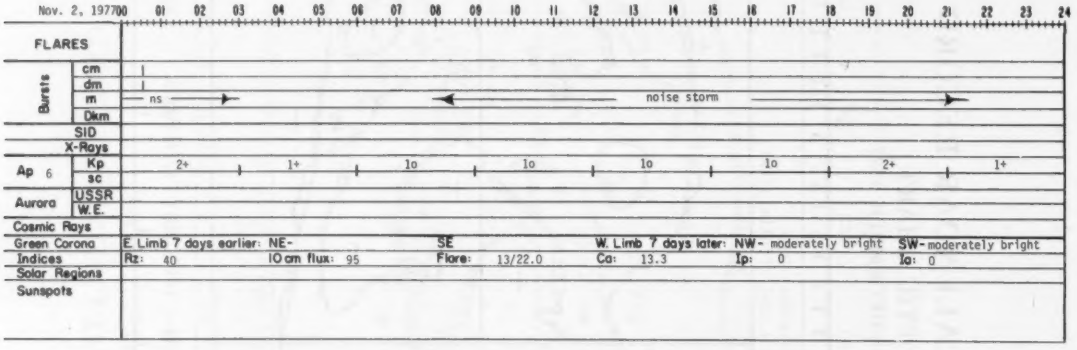
NOVEMBER - DECEMBER 1977

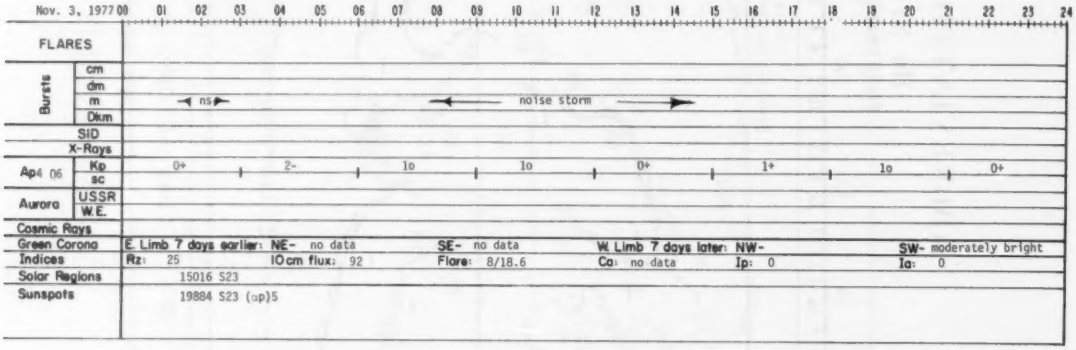


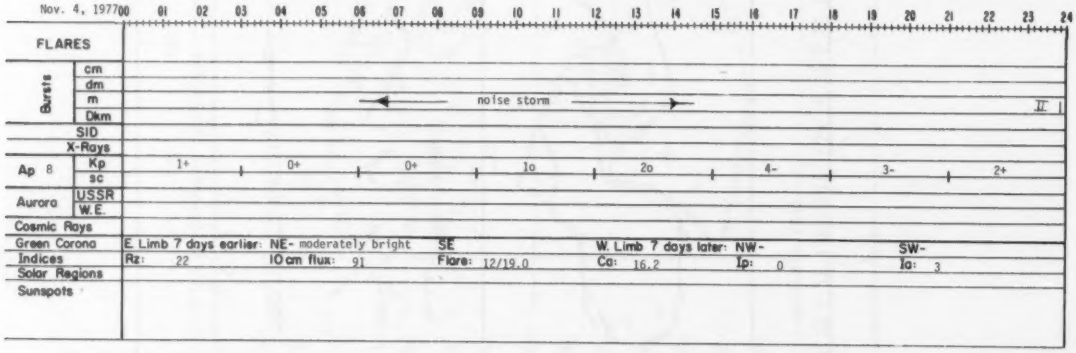
ABBREVIATED CALENDAR RECORD

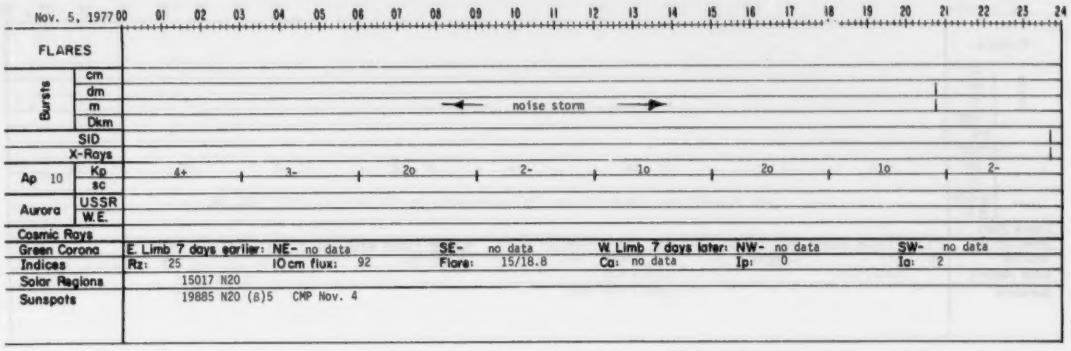
NOVEMBER 1977

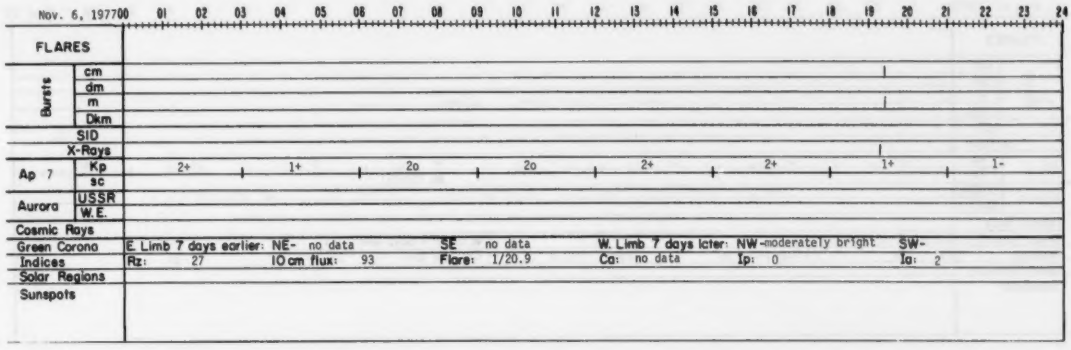


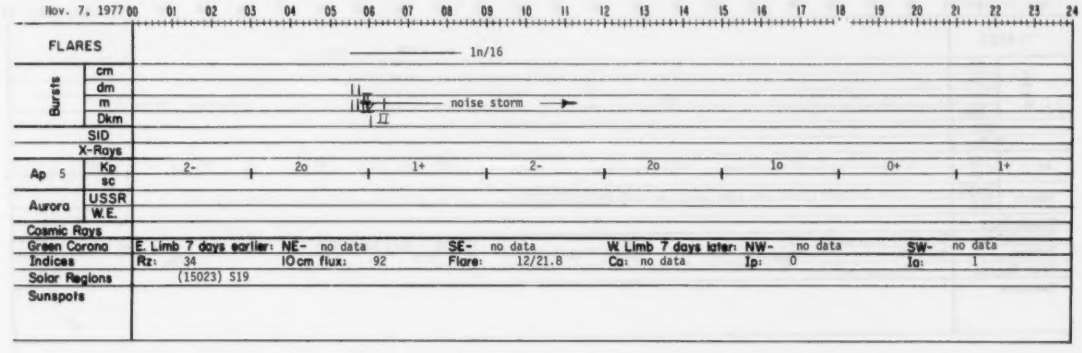







Nov. 5, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 10
Kp
sc
4+ 3- 2o 2- 1o 2o 1o 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 25 10 cm flux: 92 Flare: 15/18.8 Ca: no data Ip: 0 Ia: 2
Solar Regions
15017 N20
Sunspots
19885 N20 (8)5 CMP Nov. 4


Nov. 6, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 7
Kp
sc
2+ 1+ 2o 2o 2+ 2+ 1+ 1-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW-moderately bright SW-
Indices
Rz: 27 10 cm flux: 93 Flare: 1/20.9 Ca: no data Ip: 0 Ia: 2
Solar Regions
Sunspots


Nov. 7, 1977
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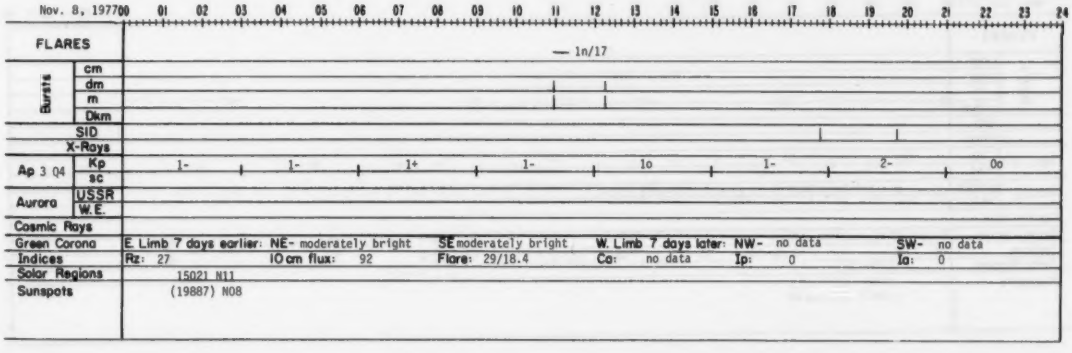
FLARES
1n/16
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 5
Kp
sc
2- 2o 1+ 2- 2o 1o 0+ 1+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 34 10 cm flux: 92 Flare: 12/21.8 Ca: no data Ip: 0 Ia: 1
Solar Regions
(15023) S19
Sunspots


Nov. 8, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/17
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 3 Q4
Kp
sc
1- 1- 1+ 1- 1o 1- 2- 0o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE moderately bright W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 27 10 cm flux: 92 Flare: 29/18.4 Ca: no data Ip: 0 Ia: 0
Solar Regions
15021 N11
Sunspots
(19887) N08

Nov. 9, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m; Dkm

SID

X-Rays

Ap 3 Q3 — Kp: 1o | 2- | 1- | 1- | 0+ | 1- | 1o | 0o

sc

Aurora — USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- moderately bright SE- moderately bright W. Limb 7 days later: NW- moderately bright SW-

Indices — Rz: 31 10cm flux: 93 Flare: 10/17.8 Ca: no data Ip: 0 Ia: 1

Solar Regions — (15022) S25 (15032) S25

Sunspots — (19891) S24 (Bp)4

Nov. 10, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m; Dkm

SID

X-Rays

Ap 9 — Kp: 0+ | 0+ | 2- | 1+ | 3o | 3+ | 2o | 3o

sc — ▲1309(9)

Aurora — USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-

Indices — Rz: 25 10cm flux: 95 Flare: 7/19.2 Ca: no data Ip: 0 Ia: 1

Solar Regions

Sunspots

Nov. 11, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES — 1n/24

Bursts: cm; dm; m — 1E; Dkm

SID

X-Rays

Ap 6 — Kp: 2+ | 1+ | 1+ | 2- | 2o | 1+ | 1+ | 2-

sc

Aurora — USSR; W.E. — ϕ = 57° 1500 (R,A1) and 1600 (HA1); ϕ = 58° 2300-2400 (HA1)

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data

Indices — Rz: 26 10cm flux: 97 Flare: 44/20.3 Ca: 10.6 Ip: 0 Ia: 0

Solar Regions — (15024) N25 (2)

Sunspots

Nov. 12, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm — 1; m; Dkm

SID

X-Rays

Ap 18 05* — Kp: 3+ | 4+ | 3+ | 3+ | 3- | 3o | 3- | 4-

sc

Aurora — USSR; W.E. — ϕ = 59° 1400-1700 (R,R1-2) and 1500-1900 (HA1)

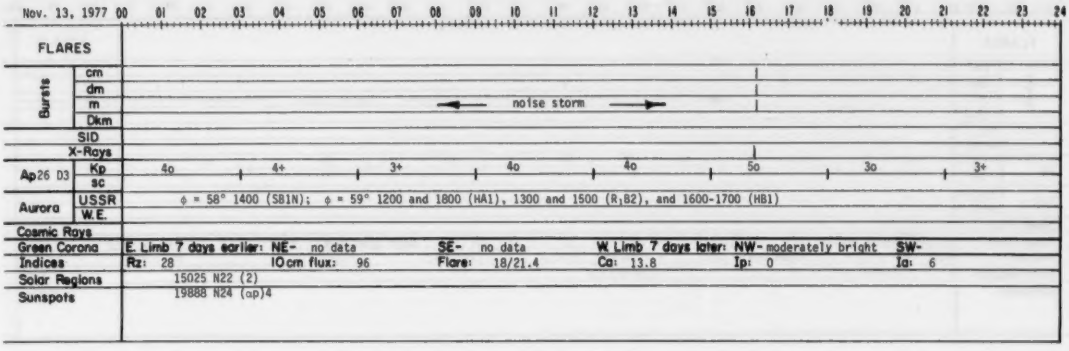
Cosmic Rays

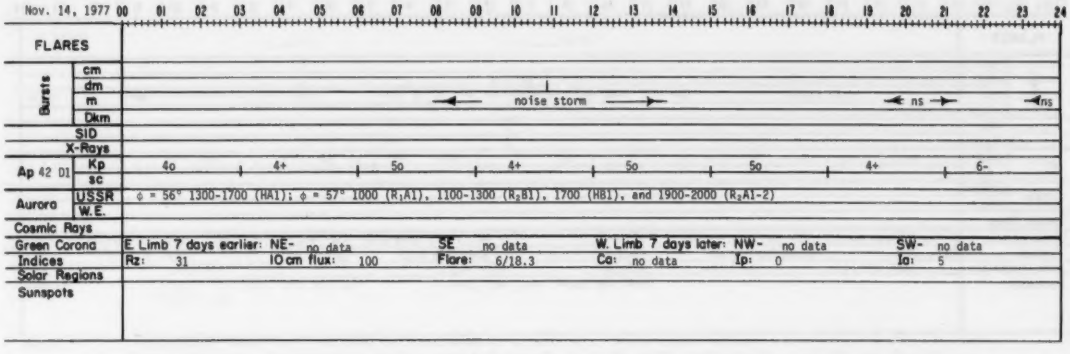
Green Corona — E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- moderately bright SW-

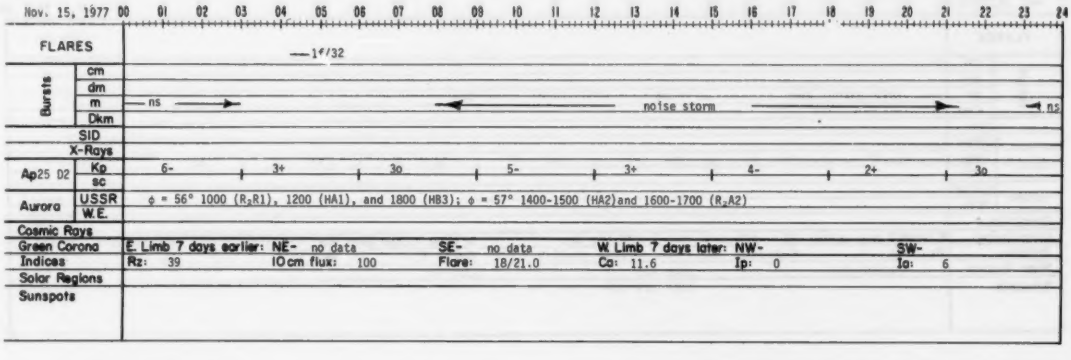
Indices — Rz: 27 10cm flux: 93 Flare: 10/21.3 Ca: 12.4 Ip: 0 Ia: 4

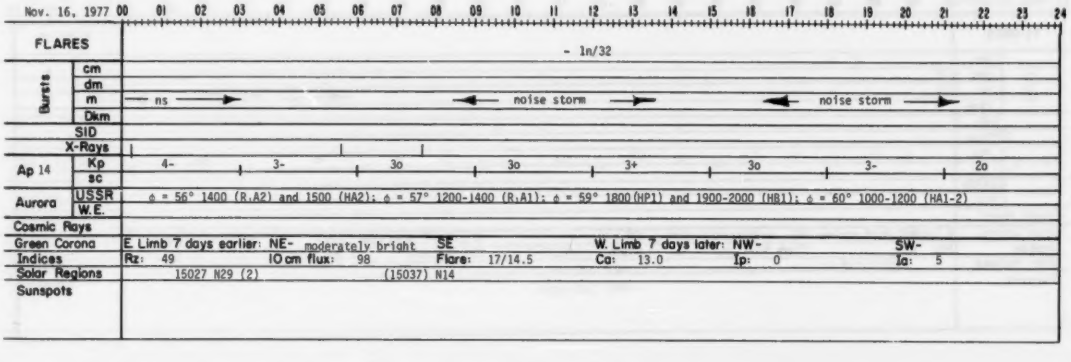
Solar Regions — 15026 S23

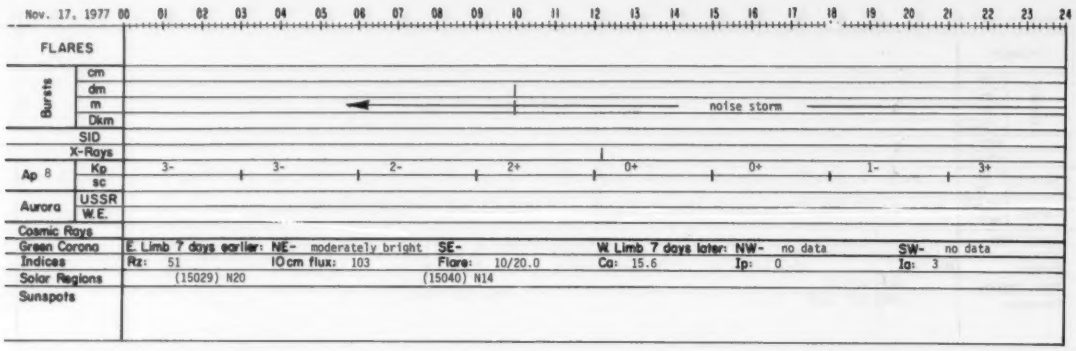
Sunspots — 19889 S22 (af)3; (19892) S25 (ap)4

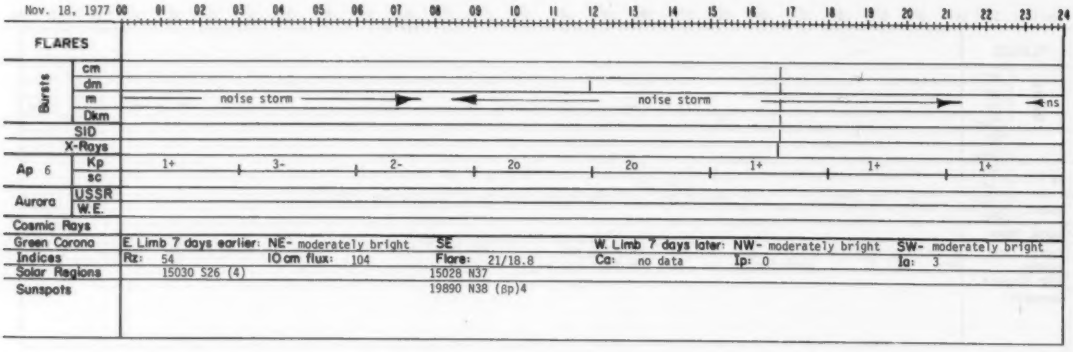

Nov. 13, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap26 D3
Kp
sc
4o 4+ 3+ 4o 4o 5o 3o 3+
Aurora
USSR
W.E.
ϕ = 58° 1400 (SB1N); ϕ = 59° 1200 and 1800 (HA1), 1300 and 1500 (R,B2), and 1600-1700 (HB1)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- moderately bright SW-
Indices
Rz: 28 10cm flux: 96 Flare: 18/21.4 Ca: 13.8 Ip: 0 Ia: 6
Solar Regions
15025 N22 (2)
Sunspots
19888 N24 (ap)4

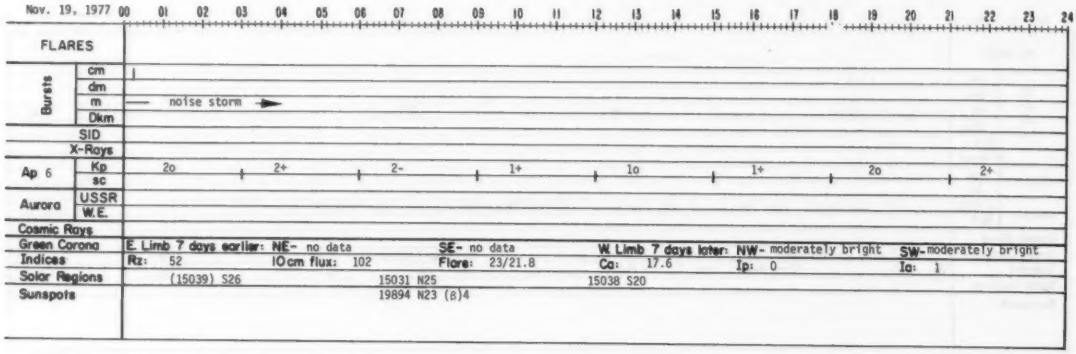

Nov. 14, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
ns
ns
SID
X-Rays
Ap 42 D1
Kp
sc
4o 4+ 5o 4+ 5o 5o 4+ 6-
Aurora
USSR
W.E.
ϕ = 56° 1300-1700 (HA1); ϕ = 57° 1000 (R,A1), 1100-1300 (R,B1), 1700 (HB1), and 1900-2000 (R,A1-2)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 31 10cm flux: 100 Flare: 6/18.3 Ca: no data Ip: 0 Ia: 5
Solar Regions
Sunspots

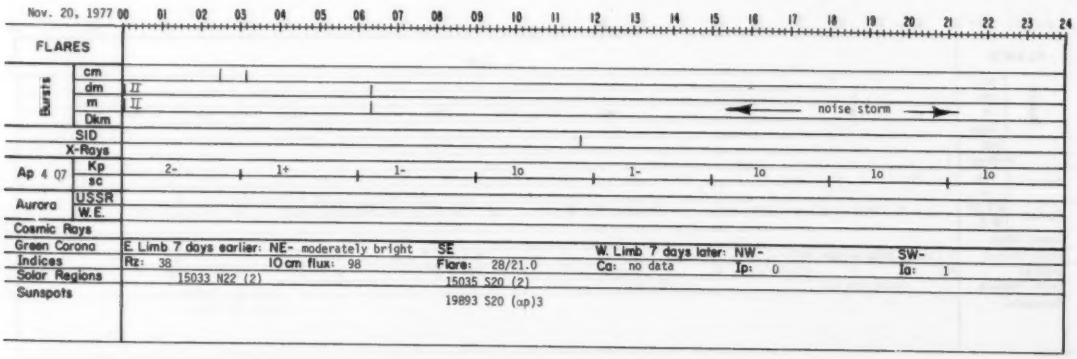

Nov. 15, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1f/32
Bursts
cm
dm
m
Dkm
ns
noise storm
ns
SID
X-Rays
Ap25 D2
Kp
sc
6- 3+ 3o 5- 3+ 4- 2+ 3o
Aurora
USSR
W.E.
ϕ = 56° 1000 (R,R1), 1200 (HA1), and 1800 (HB3); ϕ = 57° 1400-1500 (HA2)and 1600-1700 (R,A2)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices
Rz: 39 10cm flux: 100 Flare: 18/21.0 Ca: 11.6 Ip: 0 Ia: 6
Solar Regions
Sunspots

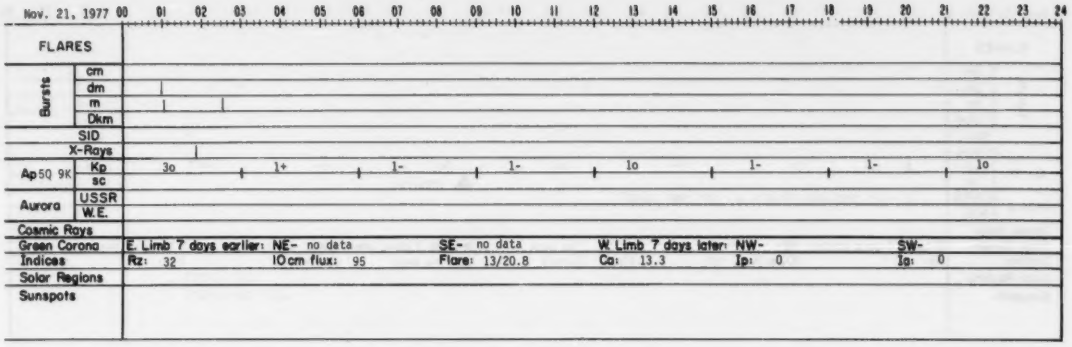

Nov. 16, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
- 1n/32
Bursts
cm
dm
m
Dkm
ns
noise storm
noise storm
SID
X-Rays
Ap 14
Kp
sc
4- 3- 3o 3o 3+ 3o 3- 2o
Aurora
USSR
W.E.
ϕ = 56° 1400 (R,A2) and 1500 (HA2); ϕ = 57° 1200-1400 (R,A1); ϕ = 59° 1800 (HP1) and 1900-2000 (HB1); ϕ = 60° 1000-1200 (HA1-2)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- SW-
Indices
Rz: 49 10cm flux: 98 Flare: 17/14.5 Ca: 13.0 Ip: 0 Ia: 5
Solar Regions
15027 N29 (2) (15037) N14
Sunspots

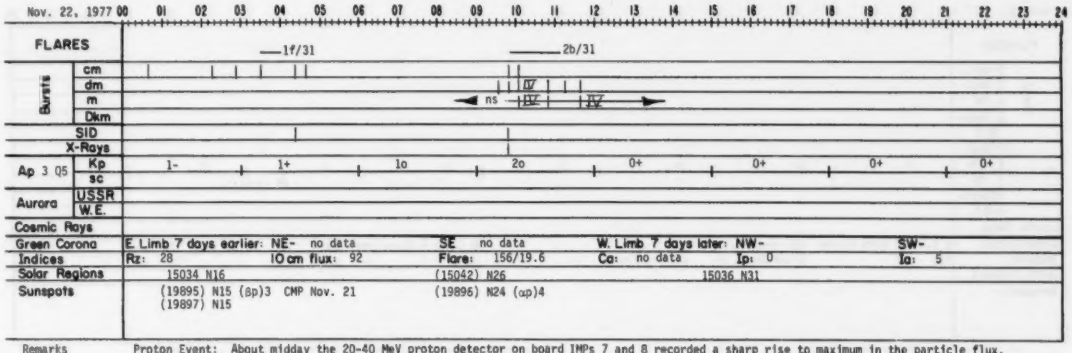

Nov. 17, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 8
Kp
sc
3- 3- 2- 2+ 0+ 0+ 1- 3+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE-
W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 51 10cm flux: 103 Flare: 10/20.0 Ca: 15.6 Ip: 0 Ia: 3
Solar Regions
(15029) N20 (15040) N14
Sunspots


Nov. 18, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
noise storm
ns
SID
X-Rays
Ap 6
Kp
sc
1+ 3- 2- 2o 2o 1+ 1+ 1+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE
W. Limb 7 days later: NW- moderately bright SW- moderately bright
Indices
Rz: 54 10cm flux: 104 Flare: 21/18.8 Ca: no data Ip: 0 Ia: 3
Solar Regions
15030 S26 (4) 15028 N37
Sunspots
19890 N38 (βp)4


Nov. 19, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 6
Kp
sc
2o 2+ 2- 1+ 1o 1+ 2o 2+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data
W. Limb 7 days later: NW- moderately bright SW- moderately bright
Indices
Rz: 52 10cm flux: 102 Flare: 23/21.8 Ca: 17.6 Ip: 0 Ia: 1
Solar Regions
(15039) S26 15031 N25 15038 S20
Sunspots
19894 N23 (β)4

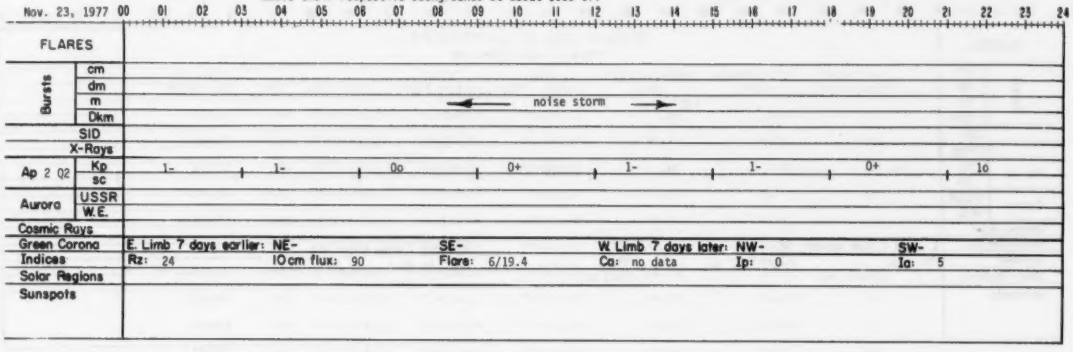

Nov. 20, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
II
m
II
Dkm
noise storm
SID
X-Rays
Ap 4 Q7
Kp
sc
2- 1+ 1- 1o 1- 1o 1o 1o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE
W. Limb 7 days later: NW- SW-
Indices
Rz: 38 10cm flux: 98 Flare: 28/21.0 Ca: no data Ip: 0 Ia: 1
Solar Regions
15033 N22 (2) 15035 S20 (2)
Sunspots
19893 S20 (αp)3

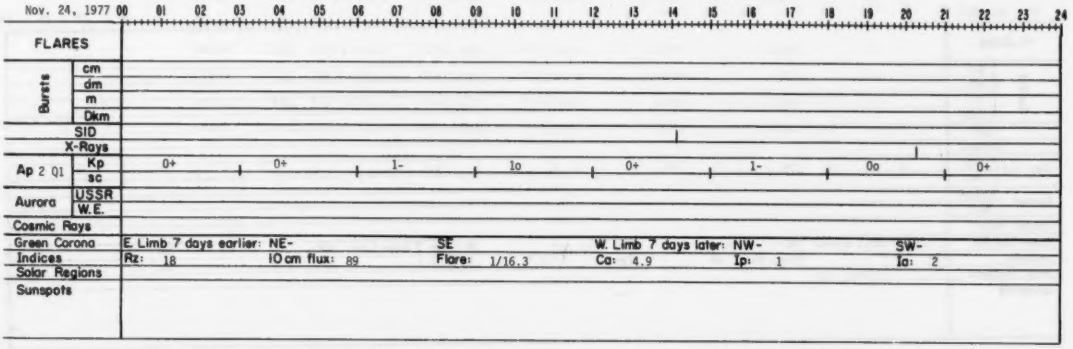




Remarks

Proton Event: About midday the 20-40 MeV proton detector on board IMPs 7 and 8 recorded a sharp rise to maximum in the particle flux.
Ground Level Event: Neutron monitor counting rates at Durham (R_c = 1.56 GV) and Mt. Washington (R_c = 1.35 GV) rose 17.8 and 31.1% above their respective backgrounds at about 1030 UT.





Nov. 25, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 15 — Kp: 1- | 0+ | 0+ | 1o | 3o | 3- | 4+ | 5o — sc: ▲ 1227(19)

Aurora — USSR: ϕ = 57° 2000-2400 (R_2R1); ϕ = 58° 1900 (R_2R2) — W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- no data; SW- no data

Indices — Rz: 10; 10cm flux: 87; Flare: 0/23.3; Ca: no data; Ip: 0; Ia: 5

Solar Regions

Sunspots

Nov. 26, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 19 04+ — Kp: 5+ | 3+ | 2o | 3+ | 3o | 3o | 2o | 3o — sc: ▲ 1704(18)

Aurora — USSR — W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- moderately bright; SE; W. Limb 7 days later: NW-; SW-

Indices — Rz: 9; 10cm flux: 86; Flare: 0/23.5; Ca: 3.7; Ip: 0; Ia: 0

Solar Regions

Sunspots

Nov. 27, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m (II), Dkm

SID

X-Rays

Ap 12 — Kp: 5o | 2+ | 3- | 2o | 2- | 1+ | 2- | 1+ — sc

Aurora — USSR — W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE-; SE-; W. Limb 7 days later: NW-; SW-

Indices — Rz: 14; 10cm flux: 86; Flare: 2/20.4; Ca: no data; Ip: 0; Ia: 1

Solar Regions — (15043) N21; 15041 N35 (3)

Sunspots

Nov. 28, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 5 Q10 — Kp: 2- | 2+ | 2- | 2- | 1- | 1o | 1- | 1+ — sc

Aurora — USSR — W.E.

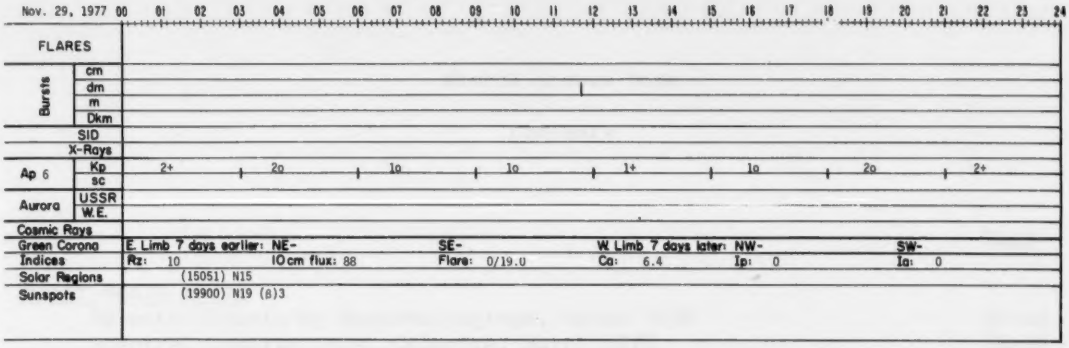
Cosmic Rays

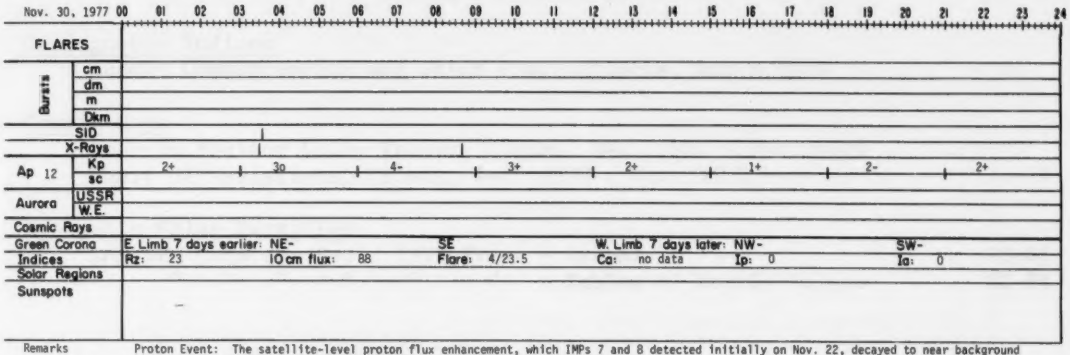
Green Corona — E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW-; SW-

Indices — Rz: 9; 10cm flux: 88; Flare: 4/22.7; Ca: 6.1; Ip: 0; Ia: 2

Solar Regions — (15050) N21

Sunspots





Remarks Proton Event: The satellite-level proton flux enhancement, which IMPs 7 and 8 detected initially on Nov. 22, decayed to near background level by the end of the day.

REGIONAL FLARE INDEX
INCLUDES ALL FLARES

HC MATH PLAGE NO.	LAT	CMP DATE	DATE FIRST FLARE	DATE LAST FLARE	FLARE-INDEX SUM	FLARE-INDEX MEAN	TOTAL NO. OF FLARES
15013	N22	77/11/01.6	77/10/27	77/10/27	.84	.84	1
15016	S23	77/11/03.7	77/10/28	77/11/07	55.64	5.06	20
15063	S26	77/11/04.7	77/10/28	77/10/28	.85	.85	1
15017	N21	77/11/05.1	77/10/29	77/11/09	68.59	5.72	22
15032	S25	77/11/09.9	77/11/14	77/11/16	10.43	3.48	6
15024	N25	77/11/11.3	77/11/06	77/11/12	36.16	5.17	4
15026	S24	77/11/13.2	77/11/08	77/11/17	20.12	2.01	9
15025	N22	77/11/13.3	77/11/11	77/11/20	36.74	3.67	9
15030	S26	77/11/16.2	77/11/19	77/11/19	3.59	3.59	1
15028	N37	77/11/16.9	77/11/11	77/11/20	22.76	2.28	12
15031	N26	77/11/19.3	77/11/15	77/11/24	231.75	23.17	23
15033	N22	77/11/20.7	77/11/22	77/11/22	4.88	4.00	1
15035	S20	77/11/20.8	77/11/14	77/11/22	10.25	1.14	7
15034	N16	77/11/21.9	77/11/15	77/11/28	9.68	.69	4
15042	N26	77/11/22.2	77/11/27	77/11/28	1.85	.92	2
15051	N15	77/11/29.7	77/12/04	77/12/05	5.69	2.84	5

Miscellaneous Data

Contents

	Page
Solar Radio Waves	
Selected Events by Radioheliograph, March 1978	62-63
Spectral Observations, Culgoora, March 1978	64-69
" " Manila, January 1978	70-71
Geomagnetic Indices	
Sudden Commencements and Solar Flare Effects, March 1978	72
Cosmic Rays	
Neutron Monitor Daily Values, Climax, Dec. 1977 - Mar. 1978	73
Chart of Variations, Climax, Dec. 1977 - Mar. 1978	74-77
Energetic Solar Particles	
GMS/SEM Data for Sept. 1977 Event - Graphs	78-81
" " " " " " " - Tables of Hourly Values	82-84

SELECTED SOLAR EVENTS

MARCH 1978

Culgoora

UT Date 197.8 March	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. (R_o)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
1	0145	0146	80) 160)	1.2	280	-	3) 2)	IIIG	
3	0221	0226	43.25) 80) 160)	1.2 1.0 .8	305	-	3	IIIGG,U *	
5	0123	0126	80) 160)	1.1	110	-	2) 1)	IIIG *	
5/6	2300	0500	80) 160)	.2	0	-	1	Noise Storm	
	2300	0500	80) 160)	.9	65	-	1	Noise Storm	
7	0246	0248	43.25) 80) 160)	.6	320	-	3	IIIGG,V*	Activity from this region persisted from 6 to 10th
8/9	2300	0500	160	1.1	35	L	2	IS	Activity persisted from 8 to 13th.
9	0456	0458	43.25) 80) 160)	1.1) .9) .9)	305	-	3	IIIG,V,U*	
10	0106	0108	43.25) 80) 160)	.9	75	-	3	IIIG,V *	
10/11	2300	0500	80) 160)	.9	310	L) L)	2	I	Activity from this region persisted until 12th
	0405	0406	43.25) 80)	1.3	30	-	3) 2)	IIIG	
11/12	2300	0500	80) 160)	.9	75	R	2	I	Activity from this region from 11th to 14th.
	2300	0500	160	1.1	95	L	2	I	Activity from this region from 11th to 14th
	0308	0311	43.25) 80) 160)	1.3 1.1 1.0	5	-	3) 3) 2)	IIIG,U	
13	0208	0209	43.25) 80)	1.0	270	-	3) 2)	IIIG	Type III activity from this region also on 14th.
	0458	0459	43.25) 80) 160)	1.3	50	-	3) 2) 2)	IIIG	
13/14	2256	2257	80) 160)	1.1	20	-	3) 2)	IIIG,U	
	0338	0343	43.25) 80) 160)	1.3 .9 .6	80	-	3) 3) 3)	IIIGG,V,U,S	) Complex Source Structure
	0342	0358	43.25) 80) 160)	1.3 .9 .6	80	-	3) 2) 3)	Possible II	)
	0400	0531	80) 160)	A) .9	70) 80)		2	IV	) Type IV moved from position A to B at times indicated.
			80	B) 1.3	70		2	IV	

Days without Heliograph observations: .....Nil.....

* Other type III's observed from same position during the day.

SELECTED SOLAR EVENTS

MARCH 1978

Culgoora

UT Date 1978 March	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. (R_o)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
14/15	2330	0140	160	.8	270	Unpol-l	1	I	Complex source.
	0145	0149	80) 160)	1.0	5	-	3	IIIGG *	
	0232	0235	43.25) 80) 160)	.6 .4 .2	80) 80) 90)	-	3	IIIGG *	
15/16	2328	2333	43.25) 80) 160)	.2 .4 .6	210	-	3) 2) 1)	UNCLF., SLOW DRIFT.	
	2300	0500	43.25) 80) 160)	.2 .4 .6	210	-	3) 2) 2)	Noise Storm	
16/17	2252	2254	43.25) 80) 160)	.6 .6 .8	145	-	3) 2) 1)	IIIG,U	
17/18	2340	2342	43.25 80	.4) .2)	300	-	3) 2) 2)	IIIG,U	Activity from this region continued until 20th.
	2355	0500	43.25) 80) 160)	.3	120) 170) 170)	R	2) 2) 3)	IS, C IIIS	Complex source structure. This region persisted until 20th.
21	0100	0101	160	.1	0	L	1	I	
	2329	2331	43.25) 80) 160)	.9 .8 .8	130	-	3	IIIG,V,U	

UT Date 1978 March	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. (R_o)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
24	2311	2328	43.25) 80) 160)	1.0	270	-	3	IIIGG	Type III activity from this region also on 26th.
26	0415	0416	43.25) 80)	.2	180	-	3) 2)	IIIG	Type III activity continued until 28th.
27	0011		43.25) 80) 160)	1.1	35	-	3) 2) 2)	IIIB	
28	0032	0034	43.25) 80) 160)	1.0) .8) .6)	320	-	3) 2) 3)	IIIG	
	0035	0036	43.25) 80) 160)	1.0) .8) .6)	320	-	3) 3) 3)	II	
	0511	0515	80	.2	210	-	2	IIIG	

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0000	0745	CULG				0146	0146.5	2				IIIG
	2045	2400	CULG										
02	0000	0744	CULG										
	2045	2400	CULG	2106	2400	2	2106	2400	2				IIIG,N
			CULG	2327.5	2333	3	2327.5	2333	3	2323	2330.5	3	IIIGG,U
03	0000	0720	CULG	0000	0550	2	0000	0550	2				IIIN
			CULG	0221	0223	3	0221	0223	3	0221.5	0223	3	IIIGG,U
	2044	2400	CULG				2044	2124					IS,W
			CULG				2119						IIIG,W
04	0000	0744	CULG				0557.5	0602.5					IIIGG,W
			CULG				0600.5	0602.5	1				IIIGG
			CULG				0738.5		1				IIIB,U
	2044	2400	CULG				2044	2400					IIIN,W
			CULG				2152.5		1				IIIB
			CULG				2308	2309.5	1				IIIG
			CULG				2324.5		2				IIIB
05	0000	0744	CULG				0000	0134					IIIN,W
			CULG				0433	0744					IIIN,W
			CULG				0646	0646.5	2				IIIG
	2044	2400	CULG	2044	2400		2044	2400					IS,W
			CULG				2044	2400					IIIS,W
			CULG				2136	2137	1				IIIG,U
06			CULG				0000	0744	1				IIIS
	0000	0744	CULG	0000	0351		0000	0744					IS,W
			CULG				0151		1				IIIB
			CULG	0351	0744	1							IS
			CULG				0726.5	0729.5	2				IIIGG
			CULG				0731	0733.5	1				IIIG,U
			CULG				2044	2400					IIIS,W
	2044	2400	CULG	2044	2400	1	2044	2400	2				IS,C
			CULG	2357.5	2358	1							FAST DRIFT
07	0000	0744	CULG	0000	0744	1	0000	0445	1				IS,C
			CULG				0000	0744	1				IIIS
			CULG				0045		2	0045		1	IIIB,U
			CULG	0131.5	0132	1	0131	0132.5	2	0131.5	0132.5	2	IIIG,V
			CULG	0246	0247	1	0246	0248.5	2	0246	0247.5	2	IIIGG,V,U
			CULG				0445	0744	1				IS
			CULG	0622	0622.5	1	0621.5	0623	2	0622	0623	2	IIIG,V
			CULG				0655	0740	2				IIIG,N
			CULG				0718	0718.5	2				IIIG,U
			CULG				2044	2400	1				IIIS
	2044	2400	CULG	2044	2400	1	2044	2400	1				IS,C
			CULG	2127	2128	1	2127	2129	2				IIIG,V
			CULG				2310	2325	2				DC
			CULG	2347	2348.5	1	2347	2348.5	2				IIIG
08	0000	0740	CULG				0000	0740	1				IS,C,DC
			CULG				0000	0740					IIIS,W
			CULG				0003.5		1				IIIG
			CULG				0045	0048	1				IIIG,U
			CULG	0710.5		2	0710.5	0711	2				IIIG
			CULG				2044	2126	1				IIIS
	2044	2400	CULG				2044	2400	1				IS,C
			CULG	2059	2400								IN,W
			CULG				2126	2400					IIIS,W
			CULG				2134.5	2400	1				IIIN
			CULG	2157		1	2157	2157.5	2	2157		2	IIIG
			CULG				2302	2302.5	1	2302	2302.5	1	IIIG
			CULG				2308	2308.5	2	2308		1	IIIG
			CULG				2331		2	2331		2	IIIB
09	0000	0742	CULG	0000	0511								IS,W
			CULG				0000	0457.5	1				IIIN
			CULG				0000	0716	1				IS,C

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS
MARCH 1978

MAR 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
09			CULG				0040.5	0041	2	0040.5	0041	1	IIIG
			CULG	0057		1	0056	0100	2	0056	0056.5	1	IIIGG
			CULG	0104.5		1	0104.5	0105	2	0104.5	0105	1	IIIG
			CULG	0148	0149.5	1	0148	0149.5	2	0148	0149.5	2	IIIGG
			CULG	0153.5	0154.5	1	0153.5	0154.5	2	0153.5	0154	2	IIIGG
			CULG	0259	0259.5	1	0259	0259.5	2	0259	0259.5	2	IIIG
			CULG				0304	0304.5	2	0304	0304.5	2	IIIB
			CULG				0319.5	0320.5	2	0319.5	0320.5	1	IIIG
			CULG				0348	0348.5	2	0348	0348.5	2	IIIG
			CULG	0456.5	0457.5	1	0456.5	0457.5	3	0456.5	0457	3	IIIG,V,U
			CULG				0457.5	0742	1				IIIS
			CULG	0511	0742	1							IS
			CULG				0513.5	0524	1				UNCLF,POII
			CULG				0716	0742	2				IS,DC
	2043	2400	CULG				2043	2310	1				IIIS
			CULG	2043	2400		2043	2400					IS,C,W
			CULG	2103	2103.5	2	2103	2103.5	2				IIIG
			CULG	2104.5		2	2104.5		2				IIIG
			CULG				2310	2400					IIIS,W
10			CULG				0000	0115					IS,C,W
			CULG	0000	0742	1							IN
	0000	0742	CULG				0017.5	0742					IIIS,W
			CULG	0106	0107	2	0106	0107.5	3	0106	0107	2	IIIG,V
			CULG				0106	0109.5	1				IIIGG
			CULG				0107.5	0108	2				UNCLF
			CULG				0109		2				RS,DP
			CULG				0115	0140	1				IS,C,DC
			CULG				0140	0205					IS,C,W
			CULG				0205	0742	1				IS,C
			CULG	0218	0220.5	1							IIIG
			CULG	0231	0232.5	1							IIIG
			CULG				0246	0247.5	2				UNCLF
			CULG				0309	0309.5					UNCLF,POII
			CULG				0526	0527	2				IIIG,U
			CULG				2042.5	2400	2				IS,DC
	2042	2400	CULG				2042.5	2400	1				IIIS
			CULG	2048.5		1							IIIB
			CULG	2126	2400								IN,W
11			CULG				0000	0218	1				IS,DC
	0000	0742	CULG				0000	0742					IIIS,W
			CULG	0000	0742								IN,W
			CULG				0218	0420	1				IS,C,DC
			CULG				0405.5	0406.5	1				IIIG
			CULG				0420	0742	1				IS,DC
			CULG				0611.5	0613	2				IIIG,V
	2042	2400	CULG				2042	2400	1				IIIS
			CULG				2042	2400	1				IS
			CULG	2210.5	2400	1							IN
			CULG	2253.5	2256	1	2253.5	2254	1				IIIG
			CULG	2354.5		1	2354.5	2355	2				IIIG
12			CULG				0000	0355	1				IS,DC
	0000	0742	CULG				0000	0742	1				IIIS
			CULG	0002		1							IIIG
			CULG	0026.5	0742	1							IN
			CULG				0145	0215	1				IS,C
			CULG				0308.5	0310	1				IIIG,U
			CULG				0355	0520					IS,W
			CULG				0447.5		1				IIIG,U
			CULG				0520	0742	1				IS,DC
			CULG	0643.5	0644	1							IIIG
			CULG				2042	2400	1				IIIN
			CULG				2042	2400					IIIS,W
	2042	2400	CULG				2042	2400	1				IS,DC
			CULG				2137	2137.5	2				IIIG
			CULG	2138		1							IIIB
			CULG				2238.5	2240	1	2239		1	IIIGG
			CULG				2327.5	2328	2				IIIG,V,U

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
13	0000	0730	CULG	0000	0455								IN,W
			CULG				0000	0730					IIIS,W
			CULG				0000	0450					IS,W
			CULG				0208.5	0209.5	2				IIIG
			CULG				0228	0229	1				IIIG
			CULG				0450	0631	2				IS,C
			CULG	0455	0730	1							IN,DC
			CULG				0458.5	0459	2				IIIG
			CULG	0557		1							IIIG
			CULG				0631	0730	1				IS,DC
	2042	2400	CULG	2042	2400	1	2042	2400	1				I,DC
			CULG				2042	2400	1				IIIS
			CULG				2256.5	2257.5	2				IIIG,U
			CULG	2325.5	2326.5	1							FAST DRIFT
			CULG	2330.5	2334.5	1							FAST DRIFT
14	0000	0741	CULG	0000	0741	1	0000	0741	1				I,DC
			CULG				0024	0558					IIIN,W
			CULG	0032.5		1	0032.5		1	0032.5		1	IIIB
			CULG	0338.5	0344	2	0338.5	0343	2	0338.5	0343	2	IIIGG,V,U,
			CULG				0342	0358	1				POSSIBLEII
			CULG							0342	0355	1	S.W.F.
			CULG				0344	0345.5	2	0344	0345.5	1	IIIG
			CULG				0558	0741	1				IIIS
			CULG				2042	2400	1				IIIN
	2042	2400	CULG	2042	2400	1	2042	2400	1				I
			CULG				2059		2				IIIB
			CULG				2205		2				IIIB
			CULG	2309	2309.5	1	2309	2309.5	1				IIIG
15	0000	0740	CULG	0000	0740	1	0000	0740	1				I,DC
			CULG	0009	0010	1							FAST DRIFT
			CULG	0055.5	0103	1	0055.5	0103	1				IIIGG
			CULG				0104	0105	1	0104	0104.5	1	IIIG
			CULG	0137	0450	1	0124.5	0740	1				IIIN
			CULG	0145.5	0148.5	2	0145.5	0148.5	2				IIIGG
			CULG				0209.5	0210	1				IIIB
			CULG	0232.5	0234.5	2	0232.5	0234.5	2	0233.5	0234	1	IIIGG
			CULG	0249.5	0250	2	0249.5	0250	2				IIIG,U
			CULG	0251.5	0252	2	0251.5	0252	2				IIIG,U
			CULG				0321		2				IIIB,U
			CULG	0340.5		2	0340.5		2				IIIG,U
			CULG	0350	0358	1	0350.5		2				IIIB
	2041	2400	CULG	2041	2329								IN,W
			CULG				2043	2400	1				IIIN
			CULG				2123		1				IIIB,U
			CULG				2328.5		1				IIIB,U
			CULG				2329	2400	2				IIIS
			CULG	2329	2400	1	2329	2400	1				IS,DC
			CULG				2357	2400	2				UNCLF,SLOW
16	0000	0740	CULG	0000	0215	1	0000	0215	1				IS,C
			CULG				0000	0045	2				IIIS
			CULG				0034.5	0036	2				UNCLF,SLOW
			CULG				0045	0740	1				IIIS
			CULG				0045	0740	1				IIIS
			CULG	0215	0515	2	0215	0515	2				IS,C,DC
			CULG	0515	0740	1	0515	0740	1				IS,DC
	2041	2400	CULG	2041	2400	1	2041	2400	1				IS
			CULG				2041	2400					IIIS,W
			CULG				2244.5	2247	2				IIIG
			CULG				2250.5	2251.5	1				IIIG
			CULG				2252.5	2253	2				IIIG,U
17			CULG				0000	0740					IIIS,W
	0000	0740	CULG	0000	0240		0000	0240					IS,W
			CULG	0240	0445	1	0240	0445	1				IS,C,DC
			CULG				0254.5	0255	2				IIIG,U
			CULG				0302.5		2				UNCLF
			CULG	0445	0740	1	0445	0740	1				IS
			CULG	2041	2400		2110	2345					IS,W

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
17	2041	2400	CULG				2041	2348					IIIS,W
			CULG				2119.5	2120	2				IIIG
			CULG	2215	2215.5	1	2215	2215.5	1				IIIG
			CULG				2341		2				IIIG,U
			CULG				2345	2400	2				IS,DC
			CULG				2348	2400	2				IIIS
18	0000	0700	CULG	0000	0410	1	0000	0410	2				IS,C,DC
			CULG				0000	0700	1				IIIS
			CULG				0117		2				IIIB
			CULG	0410	0700	1	0410	0700	1				IS,DC
	0717	0740	CULG	0717	0740	1	0717	0740	1				IS
			CULG				0717	0740	1				IIIS
	2041	2400	CULG	2041	2400	1	2041	2400	1				IS,DC
			CULG				2041	2400					IIIS,W
			CULG				2112.5		1				IIIB,U
			CULG				2132.5	2136.5	1				IIIG
19	0000	0740	CULG	0000	0740	1	0000	0240	1				IS
			CULG				0000	0100	1				IIIN
			CULG				0100	0240	1				IIIS
			CULG				0147.5		2				IIIB
			CULG				0208.5		1				IIIB,U
			CULG				0211	0213	1				IIIG
			CULG				0240	0425	1				I
			CULG				0307		1				IIIB
			CULG				0347		1				IIIB
			CULG				0359.5		1				IIIB
			CULG				0402		1				IIIB
			CULG				0420.5	0421					IIIG,W
			CULG				0425	0740	1				IS
			CULG				0433	0511.5	2				IIIS
			CULG				0521	0550	1				IIIN
			CULG	0601.5	0602	1	0601.5	0602	1				IIIG
			CULG	0634	0638	1	0634	0638	1				IIIG
			CULG				0705.5		2				IIIB,U
			CULG				0724	0740					IIIN,W
	2041	2400	CULG	2041	2400	1	2041	2154	1				IN
			CULG				2112.5		1				IIIB
			CULG				2119	2258	1				IIIN
			CULG				2123		2				IIIB
			CULG				2126.5		2				IIIB
20	0000	0740	CULG				0002	0654	1				IIIN
			CULG				0029.5		2				IIIB
			CULG	0030	0735								IW
			CULG				0042		1				IIIB
			CULG				0045	0045.5	2				IIIG
			CULG				0240.5		2				IIIB
			CULG				0258.5		2				IIIB
			CULG				0417.5		2				IIIB,U
			CULG				0654	0713	1				IIIS
			CULG				0702.5	0705	2				IIIGG,V,U
			CULG				0707	0709	2				IIIGG,U
			CULG				0709.5	0712	2				IIIGG,V,U
			CULG				0734						IIIB,W
	2040	2400	CULG	2105	2400		2040	2225					IN,W
			CULG				2114		2				IIIG
			CULG				2119	2400					IIIN,W
			CULG	2217.5	2218	2	2217.5	2218	2				IIIG,U
21	0000	0739	CULG	0000	0725		0210	0555					IN,W
			CULG				0052						IIIB,W
			CULG	0252	0253		0252	0253					IIIG,W
			CULG				0511	0540	1				I
	2040	2400	CULG	2240	2320		2040	2051					IN,W
			CULG				2255.5	2256.5	1				IIIG,U
			CULG				2259	2300	1				IIIG
			CULG				2320.5	2321.5	1				IIIG
			CULG				2329	2330	2				IIIG,V,U

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS
MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
22	0000	0739	CULG				0041	0109					IIIN,W
			CULG				0647.5		1				IIIB
	2040	2400	CULG				2040	2400	1				IS
			CULG				2104	2106	1				IIIG
			CULG	2104		1	2104		3				IIIG,U
			CULG				2137.5	2222.5	1				IIIN
23	0000	0715	CULG				0000	0416					IN,W
			CULG	0258.5	0259	1							FAST DRIFT
			CULG				0514.5	0515	1				IIIG
			CULG				0544		1				IIIG
	2042	2400	CULG	2104	2104.5	1							FAST DRIFT
			CULG	2240	2325	1							IN
24	0000	0738	CULG	0504		1							IIIB
			CULG				0722.5	0732	1				IIIGG
25	2221	2400	CULG	2249	2250.5	1							IIIG
			CULG	2249	2249.5	2	2249	2249.5	1				IIIG
26	0000	0737	CULG				0003.5	0005	1				IIIG
			CULG				0010.5						IIIB,W
			CULG				0014	0014.5					IIIG,W
			CULG				0038.5	0102	1				IIIN
			CULG				0038	0041	1				I
			CULG				0414.5	0415.5	1				IIIG
			CULG				0416.5	0418					IIIG,W
			CULG				0559	0604	2				IIIGG
			CULG				0605	0605.5	1				IIIG
			CULG				0607.5	0608.5	1				IIIG
	2038	2400	CULG				2107.5		1				IIIB
			CULG				2126	2126.5	2	2126	2126.5	1	IIIG
			CULG				2157		1				IIIB
27	0000	0738	CULG				0011		1				IIIB
			CULG				0137	0138.5	1				IIIG
			CULG				0138		2	0138		1	IIIG
			CULG				0202	0240	1				I
			CULG				0211	0224.5	1				IIIN
			CULG				0212	0213	2				IIIG
			CULG				0213		3	0213		2	IIIB
			CULG				0350	0630	1				IS,C
			CULG	0352	0640	1							IN
			CULG				0358	0738	1				IIIS
			CULG				0630	0738	1				IS
	2038	2400	CULG	2038	2225	1	2038	2304	1				I
			CULG				2038	2400					IIIS,W
			CULG				2147.5	2154	1				IIIG,UNCLF
			CULG				2330	2400	1				IS
28	0000	0731	CULG				0000	0200	1				IS
			CULG				0000	0154					IIIS,W
			CULG				0033	0033.5	2				IIIG
			CULG				0035	0038.5	2				II
			CULG	0144	0210	1							IN
			CULG	0240	0335	1	0240	0345	1				IS
			CULG				0448	0452.5					IIIG,W
			CULG				0511.5	0512	1				IIIG
			CULG				0513	0515	1				IIIG
			CULG	0537.5	0538.5	1							IIIG
			CULG	0709	0713	1	0710	0710.5	1				IIIG
	2039	2400	CULG				2044	2136					IIIN,W
			CULG				2144	2230	1				I
29	0000	0736	CULG				0150.5	0151	1				IIIG,U
			CULG	0649	0651.5	1	0649	0651.5	2				IIIGG
	2037	2400	CULG				2126	2126.5	1				IIIG
			CULG				2150.5		1				IIIB
			CULG				2254	2251					IIIN,W
30	0000	0736	CULG				0406.5	0408	1				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

MARCH 1978

MAR 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
30	2037	2400	CULG	2321	2400								IN,W
			CULG	2329	2335	1							N,FAST DRI
			CULG				2347.5						IIIB,W
31	0000	0732	CULG	0000	0426								IN,W
			CULG				0023.5						IIIB,W
			CULG				0308.5	0309					IIIG,W
			CULG				0345.5	0347					IIIG,W
			CULG	0405	0410	1							N,FAST DRI
			CULG	0500	0501	1	0500	0501	1				IIIG
	2036	2400	CULG										

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of burst
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JANUARY 1978

JAN 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0000	0932	MANI										
	2153	2400	MANI										
02	0000	0923	MANI										
	2200	2400	MANI										
03	0000	0927	MANI							0308.6	0308.9	1	III
	2203	2400	MANI										
04	0000	0930	MANI							0408.3	0410.5	2	III
			MANI							0829.9	0831.5	2	III
	2218	2400	MANI										
05	0000	0633	MANI										
	0732	0929	MANI										
	2206	2400	MANI										
06	0000	0930	MANI							0153.1	0153.3	1	III
			MANI							0335.8	0336.2	2	III
			MANI							0541.5	0543.8	1	IIIG
	2214	2400	MANI							2338.3	2338.6	1	III
07	0000	0947	MANI							0210.5	0315.0	2	CONT
			MANI							0343.5	0638.5	3	IV
	2219	2400	MANI										
08	0000	0931	MANI							0024.5	0025.2	1	III
			MANI							0027.1	0027.4	1	III
			MANI							0208.5	0210.6	1	IIIG
			MANI							0622.8	0623.4	1	III
	2210	2400	MANI										
09	0000	0930	MANI										
	2214	2400	MANI										
10	0000	0929	MANI										
	2210	2410	MANI										
11	0000	0811	MANI										
	0846	0930	MANI										
	2206	2400	MANI										
12	0000	0317	MANI										
	0357	0933	MANI										
	2204	2400	MANI										
13	0000	0928	MANI										
	2152	2400	MANI										
14	0000	0937	MANI										
	2208	2400	MANI										
15	0000	0938	MANI										
	2208	2400	MANI										
16	0000	0930	MANI										
	2151	2400	MANI										
17	0000	0938	MANI										
	2142	2400	MANI										
18	0000	0933	MANI										
	2132	2400	MANI										
19	0000	0931	MANI										
	2140	2400	MANI										
20	0000	0934	MANI										
	2152	2400	MANI										
21	0000	0940	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS
JANUARY 1978

JAN 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
22	0000	0934	MANI										
	2141	2400	MANI										
23	0000	0940	MANI										
	2138	2400	MANI										
24	0000	0937	MANI										
	2154	2400	MANI										
25	0000	0933	MANI										
	2134	2400	MANI										
26	0000	0935	MANI										
	2137	2400	MANI										
27	0000	0935	MANI										
	2134	2400	MANI										
28	0000	0016	MANI										
	0040	0600	MANI										
	0629	0938	MANI										
	2210	2400	MANI										
29	0000	0937	MANI										
	2142	2400	MANI										
30	0000	0939	MANI										
	2145	2400	MANI										
31	0000	0938	MANI										
	2141	2400	MANI										

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

MARCH 1978

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romana)
The meaning of the station symbols is given in the IAGA-BULLETIN nr. 16.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc)

08 1439 A: SOD DOB ESK WNG WIT DOU VIC FUR HRB OTT AQU EBR COI TOL FRD HUA LMN CZT PAF; B: NGK HAD MMB KAK KNY DRV (bs: A: KSA)

26 0012 B: SOD WNG FUR HRB HUA; C: WIT PAF (si: B: TOL- bps: C: LMN)

26 1334 A: SOD DOB WNG WIT FUR HRB EBR COI TOL LMN CZT PAF; B: NGK DRV (si: B: VIC)

Solar-flare effects (sfe)

Effects confirmed by ionospheric or solar observations are underlined.

02 1832 - 1841 HUA

12 1813 - 1822 HUA

Very unusual events

01 1123 bp: KGL (-474, +189, +98) CZT (+120, -136, +74)

27 1708 bp: KGL (-380, -271, +200) CZT (+112, -128, +70)

COSMIC RAY INDICES
(Neutron Monitors)

CLIMAX

Date	DEC. 1977 Average cts/hr	JAN. 1978 Average cts/hr	FEB. 1978 Average cts/hr	MAR. 1978 Average cts/hr
1	4223.4	4196.1(24)	4186.3	4183.4
2	4283.0	4202.5(22)	4235.0	4168.3
3	4257.1	4209.3(18)	4252.7	4204.8
4	4265.0	4089.5(8)	4251.1	4209.7
5	4287.4(36)	4146.7(38)	4278.1	4187.1
6	4274.9	4175.7(22)	4288.8	4195.3
7	4275.0	4200.1(20)	4245.4	4172.6
8	4285.0	4219.3(12)	4272.9	4158.5
9	4301.1	4219.6	4291.9	3996.6
10	4313.7	4267.3	4277.5	3903.6
11	4338.5	4218.0	4271.5	3914.7
12	4315.6	4226.1	4290.9	3988.2(38)
13	4251.9	4219.0	4287.6	4070.8
14	4243.8	4232.7	4256.8	4114.3
15	4235.3	4279.3	3768.7	4149.8
16	4263.2(36)	4302.4(14)	4048.0	4207.3
17	--	4272.6	4154.6	4208.0
18	--	4259.2(34)	4215.1	4228.8
19	--	4256.1(26)	4217.8	4250.9
20	4248.6	4249.3(20)	4215.4(34)	4255.7
21	4239.1	4230.6(26)	4216.9	4258.8
22	4257.6	4214.3	4173.4	4283.2
23	4261.7	4249.9(36)	4162.3	4270.3
24	4256.5	4245.8	4163.0	4138.7
25	4268.3	4223.2	4134.6	4168.3
26	4234.7	4206.2	4097.5	4190.5
27	4207.4(26)	4198.3	4127.3	4230.6
28	4212.3(28)	4187.7	4161.2	4222.3
29	4226.4(32)	4166.2		4219.4
30	4226.7(18)	4105.1		4240.0
31	4226.1(30)	4131.4		4262.5
MEAN	4263.1	4213.8	4197.2	4173.1

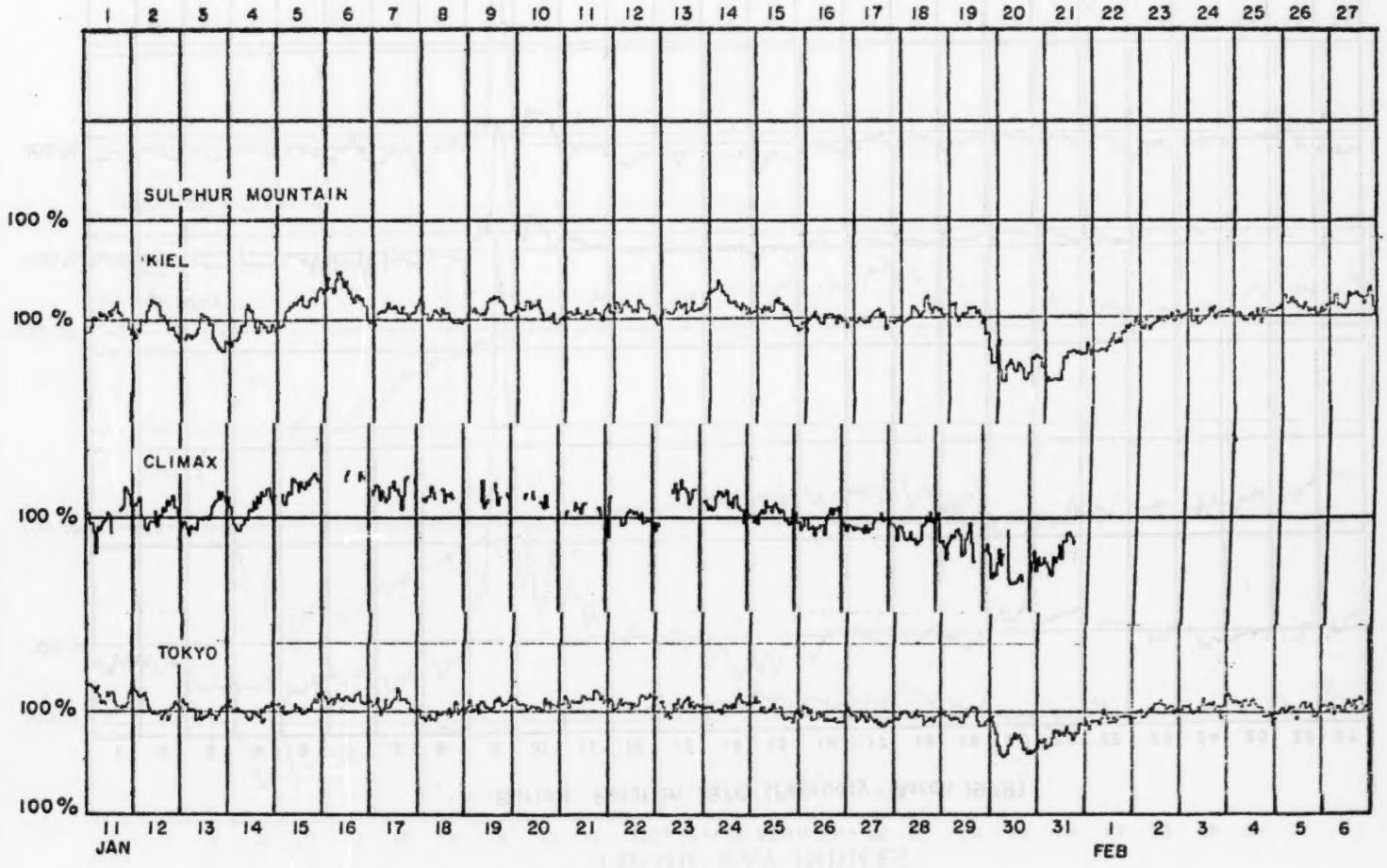
( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1974 (December 1977- January 1978)

COSMIC RAY INDICES
(Neutron Monitors)

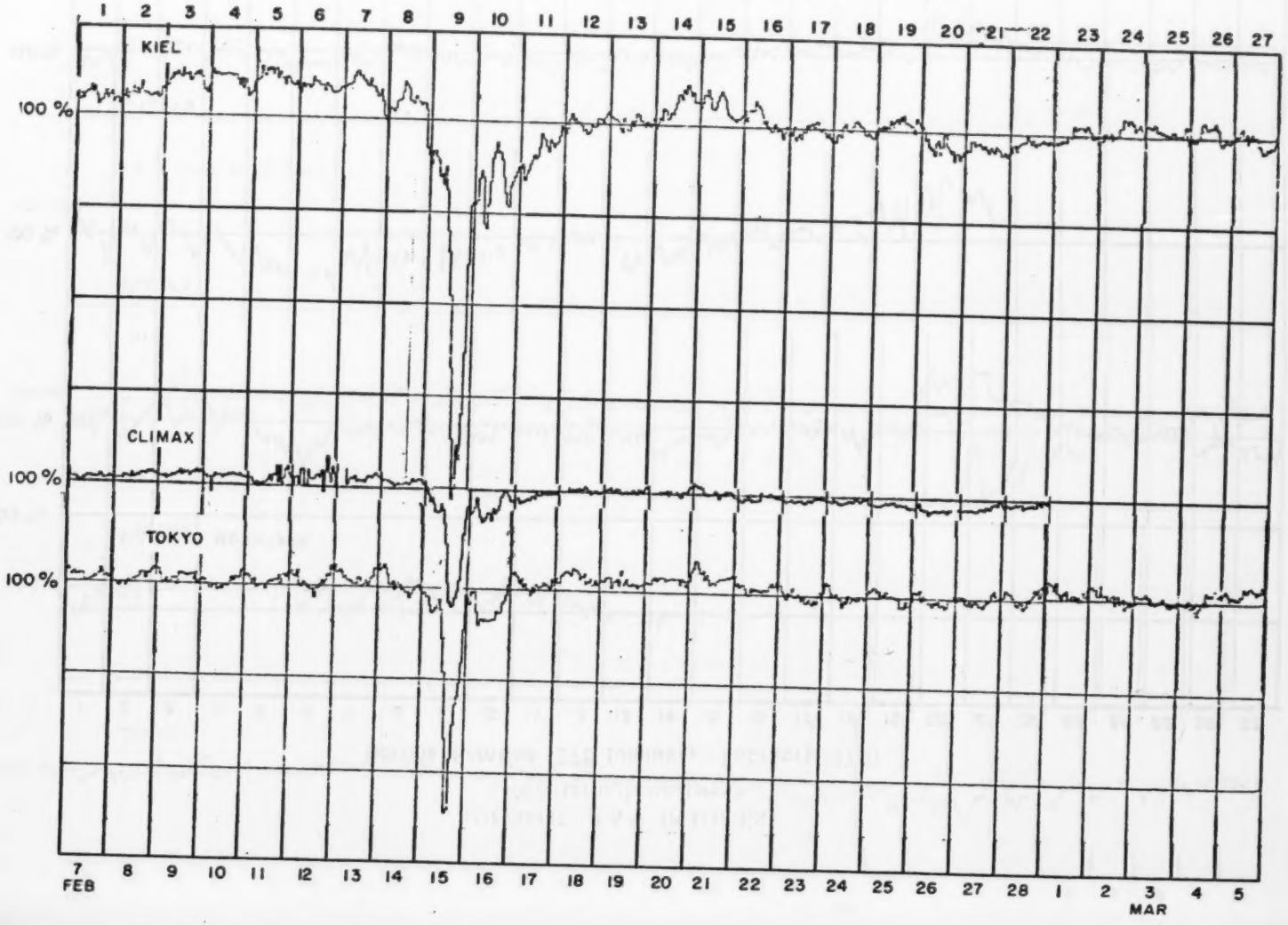
Bartels Rotation 1975 (January - February 1978)

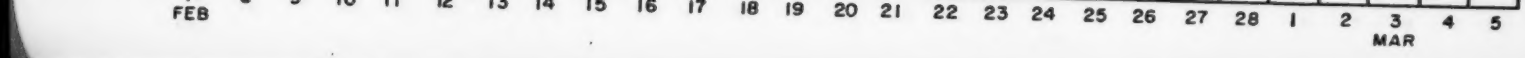


76
Misc
Dec 77-Mar 78

COSMIC RAY INDICES
(Neutron Monitors)

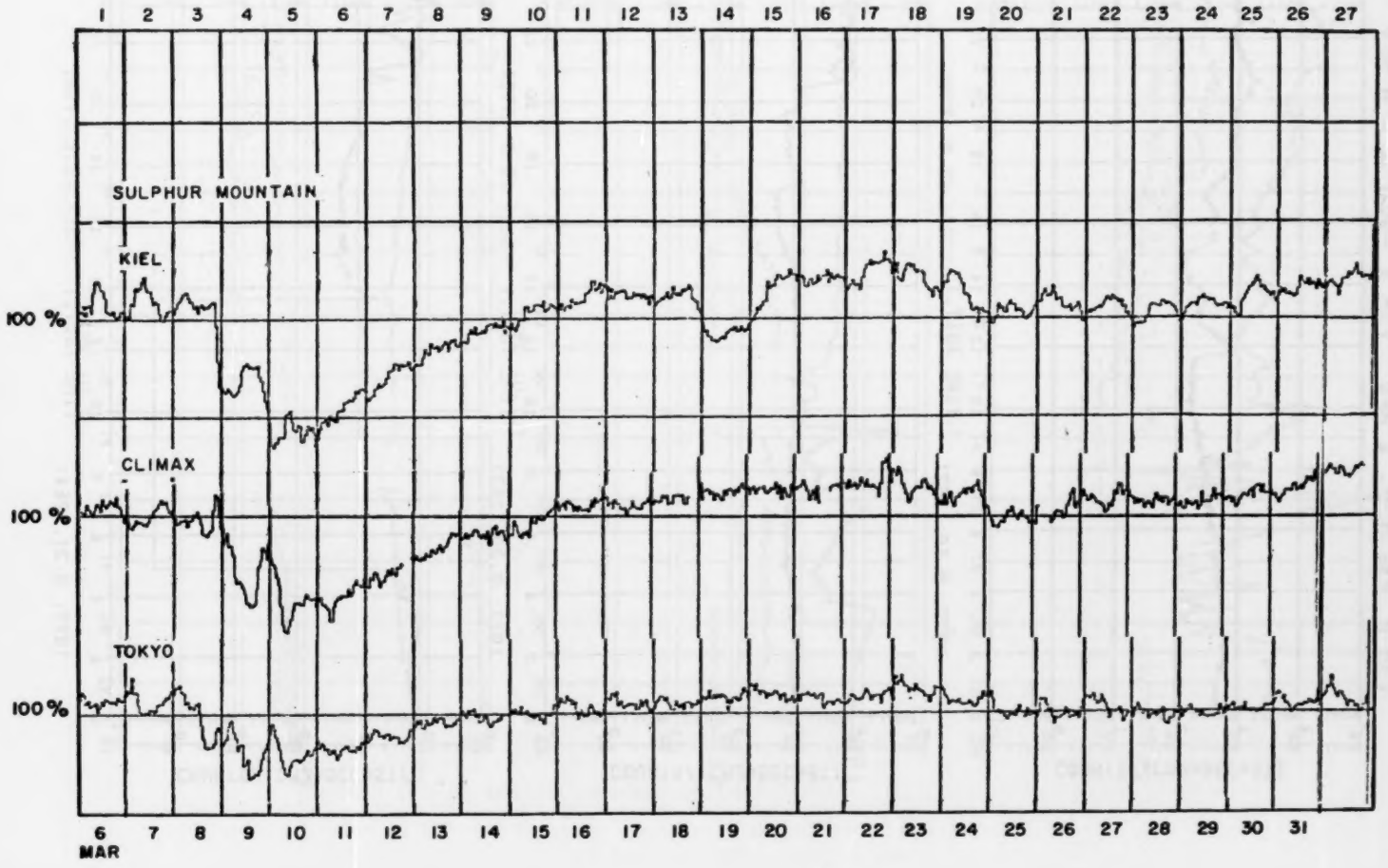
Bartels Rotation 1976 (February - March 1978)





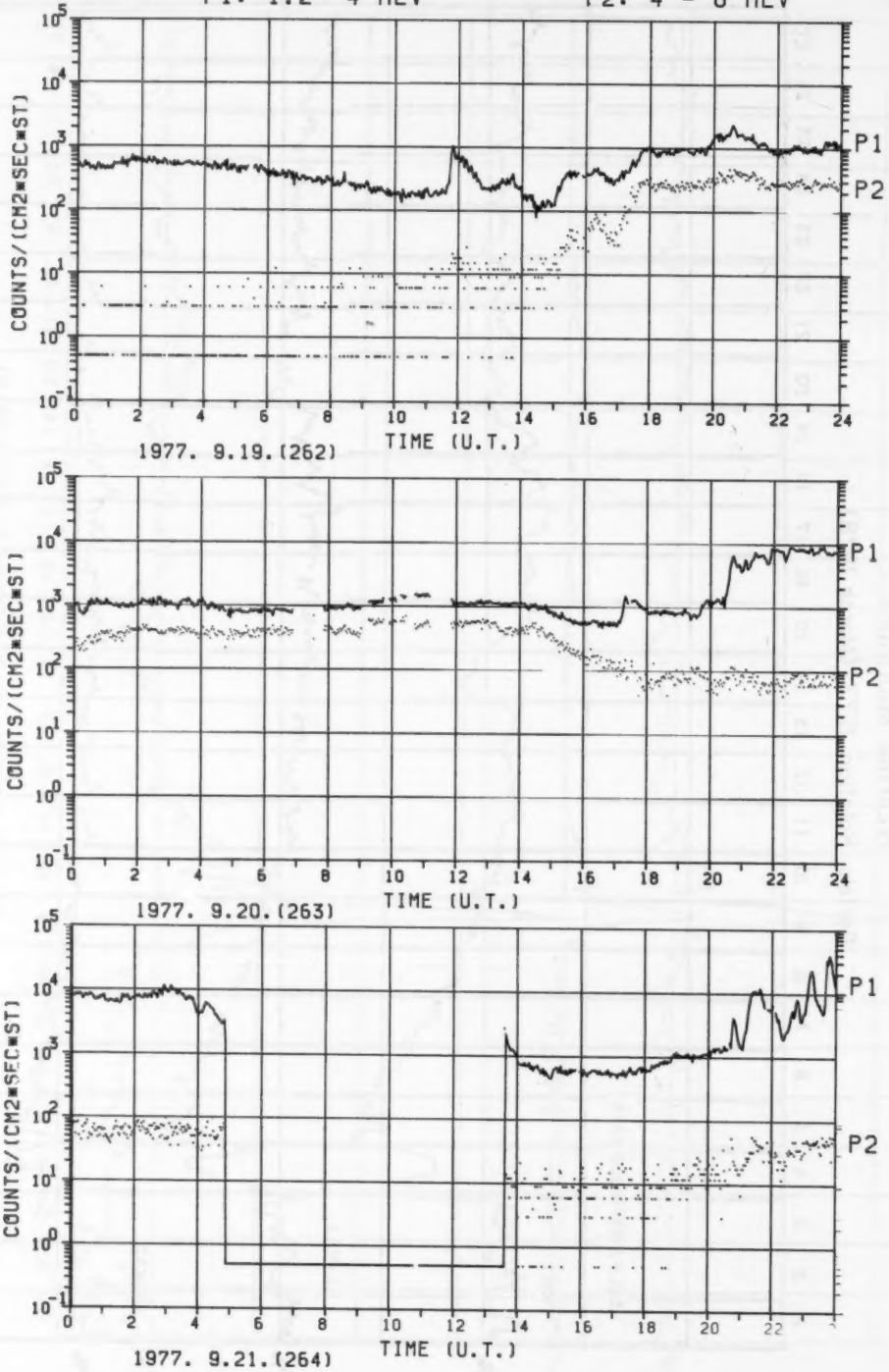
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1977 (March 1978)

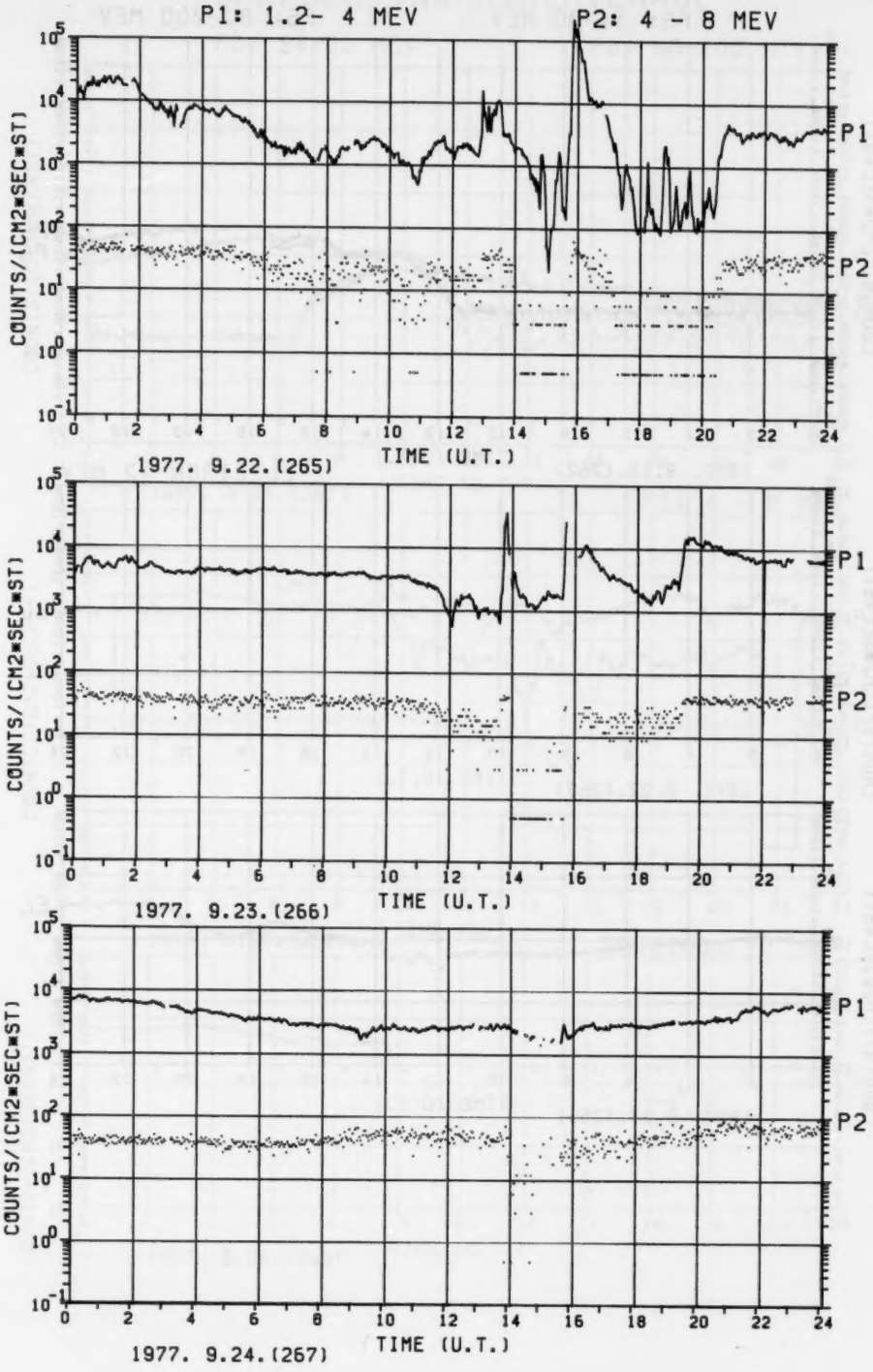


GMS/SEM TWØ-MIN.AVERAGE

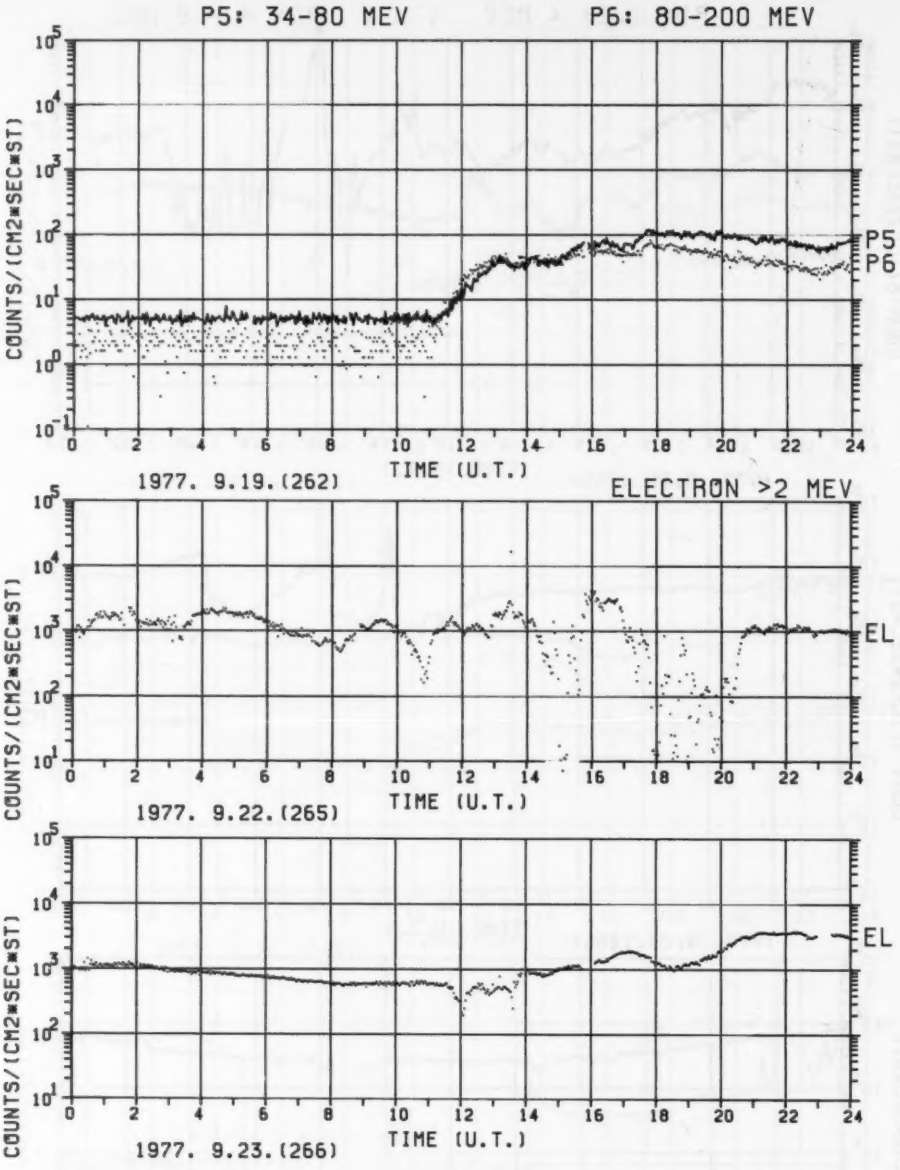
P1: 1.2- 4 MEV P2: 4 - 8 MEV



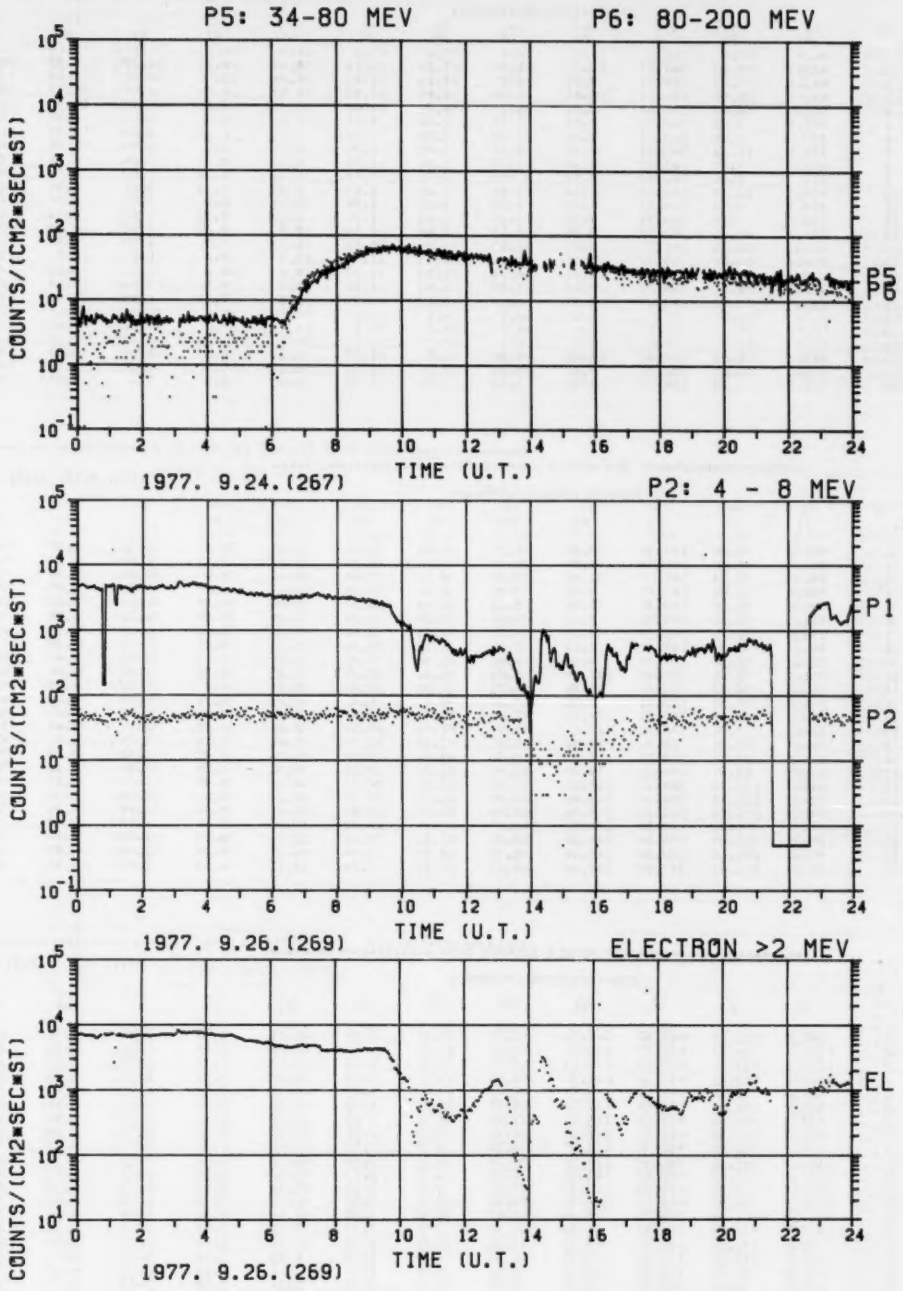
GMS/SEM TWO-MIN. AVERAGE



GMS/SEM TWO-MIN. AVERAGE



GMS/SEM TWO-MIN. AVERAGE



********** SEM HOURLY AVERAGE DATA **********

1977. 9.18. (261)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	438.1	8.35	162.57	10.25	5.08	2.28	2.18	0.32	0.0	0.07	4.33	0.05	99.4	152
1 - 2	461.6	7.79	164.45	9.80	5.27	2.11	2.55	0.56	0.0	0.01	4.29	0.10	106.5	212
2 - 3	446.7	9.99	164.28	9.85	5.46	2.48	2.30	0.32	0.0	0.08	4.33	0.08	120.6	223
3 - 4	397.9	8.98	163.40	9.95	5.27	2.23	2.40	0.22	0.11	0.04	4.33	0.06	130.4	216
4 - 5	409.9	9.62	163.76	9.64	5.30	2.06	2.37	0.0	0.0	0.02	4.36	0.07	141.2	224
5 - 6	379.5	9.85	163.58	9.84	5.00	2.09	2.14	0.22	0.22	0.05	4.35	0.05	112.3	214
6 - 7	376.9	11.12	163.18	9.82	5.11	2.49	2.36	0.75	0.0	0.08	4.36	0.07	73.5	224
7 - 8	474.7	9.87	163.62	9.49	5.23	2.44	2.28	0.33	0.11	0.04	4.31	0.08	56.9	216
8 - 9	516.7	8.66	162.64	9.51	5.18	2.21	2.48	0.32	0.32	0.02	4.37	0.08	51.2	224
9 - 10	439.8	11.19	163.42	9.46	5.11	2.29	2.53	0.22	0.22	0.01	4.34	0.07	41.4	214
10 - 11	316.4	9.54	164.43	9.75	5.04	2.12	2.56	0.17	0.0	0.05	4.35	0.0	40.2	143
11 - 12	232.6	8.94	165.32	9.34	5.24	2.13	2.26	0.11	0.23	0.02	4.31	0.09	39.9	209
12 - 13	216.8	7.75	163.74	9.34	5.14	2.48	2.24	0.0	0.12	0.05	4.36	0.06	44.3	224
13 - 14	220.2	10.30	161.07	9.49	5.15	2.26	2.11	0.28	0.0	0.03	4.37	0.03	45.0	15
14 - 15	106.0	10.26	3.42	1.11	1.48	1.11	1.85	0.0	0.0	0.0	0.0	0.0	22.0	7
15 - 16	232.5	1.54	148.30	9.11	4.76	1.67	1.92	0.0	0.0	0.0	4.10	0.0	59.5	31
16 - 17	283.5	2.61	164.77	9.08	4.98	2.62	2.82	0.0	0.0	0.08	4.46	0.05	60.1	101
17 - 18	285.9	2.70	163.46	9.33	5.16	2.22	2.26	0.0	0.19	0.08	4.43	0.02	60.1	124
18 - 19														0
19 - 20														0
20 - 21														0
21 - 22	388.6	1.70	162.01	9.10	5.00	2.11	1.97	0.17	0.17	0.07	4.34	0.06	77.9	141
22 - 23	428.2	2.82	158.81	9.03	4.80	2.32	2.13	0.0	0.0	0.0	4.38	0.11	86.3	68
23 - 24	470.3	3.42	164.19	8.64	5.18	3.33	1.97	0.0	0.0	0.0	4.44	0.0	92.2	21

********** SEM HOURLY AVERAGE DATA **********

1977. 9.19. (262)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	478.2	0.56	162.30	9.25	5.11	2.08	2.45	0.22	0.11	0.01	4.32	0.08	92.9	214
1 - 2	560.7	2.22	161.90	8.99	5.09	2.38	2.28	0.0	0.11	0.04	4.32	0.08	89.2	216
2 - 3	581.4	1.13	161.77	9.05	5.10	2.22	2.43	0.11	0.0	0.06	4.40	0.10	90.9	211
3 - 4	535.0	1.08	161.41	9.23	5.01	2.26	2.59	0.22	0.11	0.02	4.45	0.09	87.8	222
4 - 5	490.0	1.13	161.31	8.98	5.13	2.19	2.32	0.0	0.11	0.04	4.36	0.06	86.2	211
5 - 6	452.2	1.35	161.52	9.11	5.04	2.14	2.33	0.14	0.14	0.01	4.36	0.07	86.1	177
6 - 7	370.0	1.95	161.54	9.17	5.10	2.05	2.44	0.11	0.11	0.02	4.39	0.11	75.5	221
7 - 8	309.7	2.78	161.88	9.10	5.01	2.11	2.36	0.22	0.22	0.07	4.38	0.07	70.2	215
8 - 9	263.0	3.77	162.57	8.96	5.08	1.96	2.51	0.12	0.12	0.03	4.41	0.07	61.6	197
9 - 10	213.2	3.21	201.39	228.65	5.03	2.24	2.15	0.11	0.11	0.04	4.36	0.08	49.3	216
10 - 11	182.8	4.08	162.03	8.96	5.25	2.10	2.49	0.21	0.0	0.02	4.39	0.02	41.3	223
11 - 12	349.9	7.76	162.12	9.53	7.28	7.41	4.91	0.33	0.11	0.05	4.46	0.10	41.1	216
12 - 13	422.0	9.34	169.71	15.43	22.91	30.79	12.14	1.07	0.86	0.12	4.61	0.23	58.9	223
13 - 14	268.5	7.91	173.41	23.12	35.67	41.09	13.33	2.34	1.23	0.19	4.87	0.37	79.4	144
14 - 15	140.4	10.31	23.41	22.52	39.25	41.58	11.08	1.83	1.50	0.33	0.69	0.30	85.2	223
15 - 16	324.5	29.43	192.96	54.57	58.16	48.44	13.19	4.01	1.87	0.72	4.57	0.42	128.2	179
16 - 17	369.9	53.47	239.10	75.33	70.92	52.85	13.62	4.72	2.30	0.74	5.10	0.30	149.2	208
17 - 18	618.7	182.33	323.82	129.81	91.34	59.61	14.23	9.39	3.67	1.04	5.17	0.51	204.0	209
18 - 19	878.3	256.57	356.10	147.40	104.08	64.50	14.15	17.24	4.28	1.43	5.38	0.45	226.9	207
19 - 20	970.9	276.72	366.37	155.46	102.44	54.24	12.07	19.61	5.74	1.49	5.24	0.39	224.9	221
20 - 21	1680.6	379.80	418.24	174.90	91.27	43.32	10.22	20.57	5.85	1.57	4.98	0.36	228.1	213
21 - 22	1184.1	310.69	390.60	164.65	83.72	37.16	9.16	22.34	6.20	1.60	4.95	0.19	211.3	224
22 - 23	956.8	278.85	373.22	146.48	68.71	30.29	7.54	15.85	3.82	1.40	4.65	0.34	182.7	213
23 - 24	1086.8	273.33	387.07	157.08	69.51	31.20	7.09	22.55	6.41	1.40	4.84	0.29	198.7	224

********** SEM HOURLY AVERAGE DATA **********

1977. 9.20. (263)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	992.9	273.87	461.82	207.96	82.37	32.24	7.66	24.28	8.31	2.04	4.75	0.24	244.8	216
1 - 2	1008.1	359.98	485.97	202.34	71.66	27.04	6.90	27.32	10.01	1.68	4.86	0.24	238.5	220
2 - 3	1130.0	399.55	502.43	193.89	62.47	22.21	6.03	25.78	7.79	1.75	4.59	0.17	231.3	209
3 - 4	1100.8	383.61	497.10	176.87	56.63	19.48	5.03	33.30	9.02	1.39	4.70	0.18	216.1	215
4 - 5	939.6	368.19	457.53	149.71	46.22	15.69	4.87	25.75	7.82	1.05	4.78	0.21	185.6	198
5 - 6	825.2	370.49	428.46	133.01	39.79	13.34	4.30	24.92	5.63	1.00	4.57	0.20	167.9	221
6 - 7	837.3	398.05	447.26	123.91	35.67	12.08	3.89	27.22	5.29	0.90	4.61	0.10	155.9	190
7 - 8	915.9	439.98	451.95	124.65	32.94	9.20	2.85	28.73	6.58	0.71	4.66	0.06	151.7	40
8 - 9	944.7	398.45	440.92	119.39	31.59	9.89	3.50	30.67	5.70	0.89	4.42	0.12	148.8	210
9 - 10	1180.2	567.37	490.67	126.38	30.56	9.38	3.56	42.63	6.42	0.93	4.53	0.08	161.8	193
10 - 11	1448.0	527.73	462.47	117.06	30.63	8.59	3.03	33.69	4.66	0.85	4.47	0.11	178.5	44
11 - 12	1342.8	536.32	447.83	110.70	27.40	8.56	3.12	37.48	3.47	0.79	4.58	0.11	159.1	69
12 - 13	1135.4	559.51	463.62	104.12	26.06	7.57	3.04	41.41	6.81	0.73	4.45	0.05	140.4	218
13 - 14	1129.6	454.06	373.63	80.49	22.47	6.50	3.05	33.81	4.32	0.54	4.48	0.11	111.0	216
14 - 15	1006.7	426.68	220.53	61.82	14.79	5.94	2.07	23.94	2.08	0.28	0.18	0.11	83.2	219
15 - 16	656.0	231.31	260.11	49.53	15.15	4.68	2.55	15.59	1.69	0.31	3.98	0.12	67.6	212
16 - 17	565.5	143.93	231.96	31.11	10.59	3.83	2.79	8.23	0.86	0.24	4.34	0.02	59.9	224
17 - 18	1018.5	89.48	205.59	22.72	9.47	3.48	2.56	5.49	1.25	0.18	4.37	0.07	73.7	192
18 - 19	842.6	75.62	200.91	20.94	9.49	3.28	2.84	5.12	1.00	0.22	4.32	0.11	118.5	215
19 - 20	919.8	83.54	199.68	19.42	9.00	3.40	2.41	6.41	1.50	0.21	4.36	0.05	115.0	224
20 - 21	2886.5	75.68	191.67	16.34	7.62	3.18	2.62	5.68	0.67	0.17	4.24	0.06	129.6	215
21 - 22	6073.2	70.01	183.45	14.49	7.59	2.89	2.88	3.87	0.64	0.10	4.36	0.02	198.7	223
22 - 23	8017.4	71.17	181.63	14.04	7.17	2.45	2.46	3.21	0.55	0.07	4.37	0.11	566.7	216
23 - 24	7874.1	72.78	179.58	14.02	7.08	2.79	2.69	3.80	0.22	0.15	4.42	0.12	853.7	214

* SPL = Number of data points (Sampling number) per hour
Blank = no data

********** SEM HOURLY AVERAGE DATA **********

1977, 9.21. (264)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	7898.7	65.87	175.27	12.37	6.53	2.79	2.77	4.92	0.22	0.12	4.38	0.06	992.1	219
1 - 2	7010.0	57.42	175.43	11.94	6.53	2.64	2.53	3.88	0.22	0.04	4.39	0.12	854.1	216
2 - 3	8351.2	64.75	170.40	10.70	6.29	2.53	2.58	2.68	0.0	0.05	4.37	0.07	962.1	223
3 - 4	8268.6	60.20	169.06	10.56	6.05	2.49	2.57	3.34	0.33	0.11	4.33	0.08	1310.8	213
4 - 5	4351.7	52.57	166.49	8.73	5.74	2.02	2.39	1.62	0.37	0.01	4.20	0.05	725.4	192
5 - 6														
6 - 7														
7 - 8														
8 - 9														
9 - 10														
10 - 11														
11 - 12														
12 - 13														
13 - 14	1392.4	13.06	151.13	5.45	5.08	18.93	33.65	0.93	0.0	0.10	4.04	0.03	553.9	77
14 - 15	671.7	6.50	2.41	1.13	1.20	2.17	1.68	0.48	0.0	0.04	0.04	0.05	508.6	199
15 - 16	579.5	7.02	138.59	6.25	4.59	2.16	2.20	1.25	0.38	0.03	3.70	0.05	526.4	191
16 - 17	565.8	8.54	163.73	6.30	5.29	2.12	2.50	0.44	0.33	0.01	4.39	0.07	903.9	216
17 - 18	580.5	8.27	162.88	7.93	5.34	2.54	2.63	0.11	0.0	0.06	4.39	0.12	568.8	220
18 - 19	798.6	9.20	163.18	5.79	5.13	2.04	2.77	0.89	0.0	0.04	4.34	0.08	634.3	216
19 - 20	1065.7	14.50	163.26	5.36	5.37	2.34	2.45	0.43	0.0	0.02	4.39	0.12	522.4	223
20 - 21	1761.8	18.05	163.52	5.44	5.42	2.34	2.42	0.96	0.12	0.03	4.41	0.07	492.2	199
21 - 22	7003.5	32.06	162.56	5.25	5.20	2.15	2.92	0.93	0.0	0.06	4.36	0.10	652.9	180
22 - 23	4135.4	29.84	162.38	5.07	5.22	1.94	2.54	0.72	0.12	0.05	4.35	0.04	825.8	199
23 - 24	14574.7	45.28	162.46	5.16	5.31	2.32	2.31	0.71	0.0	0.04	4.30	0.12	1214.2	202

********** SEM HOURLY AVERAGE DATA **********

1977, 9.22. (265)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	18001.7	45.92	161.89	5.15	5.17	2.18	2.45	0.79	0.13	0.04	4.36	0.04	1343.4	182
1 - 2	19748.0	45.18	161.84	5.17	5.09	2.33	2.51	0.43	0.14	0.06	4.35	0.06	1702.1	168
2 - 3	8686.5	39.57	161.97	5.01	5.16	2.13	2.42	0.11	0.23	0.05	4.36	0.09	1301.3	210
3 - 4	6818.9	38.11	161.84	4.90	4.93	2.13	2.40	0.13	0.13	0.04	4.36	0.11	1351.6	191
4 - 5	6786.4	38.56	161.45	4.98	5.26	2.17	2.45	0.12	0.0	0.0	4.31	0.06	1947.4	208
5 - 6	4272.0	30.69	162.38	4.89	4.98	2.45	2.66	0.0	0.11	0.02	4.36	0.07	1684.1	213
6 - 7	1880.6	22.72	161.99	5.01	5.11	1.86	2.13	0.0	0.0	0.10	4.36	0.10	1039.9	215
7 - 8	1577.2	16.89	161.81	4.88	4.90	2.50	2.17	0.25	0.50	0.05	4.35	0.07	772.3	190
8 - 9	1645.1	18.79	162.58	4.87	5.20	1.85	2.36	0.13	0.13	0.06	4.34	0.09	743.2	181
9 - 10	2209.5	20.21	161.78	4.75	5.14	2.01	2.36	0.24	0.0	0.03	4.34	0.05	1259.0	199
0 - 11	1083.3	9.72	161.77	4.72	5.10	1.78	2.38	0.12	0.12	0.04	4.37	0.05	561.6	207
1 - 12	1902.9	17.36	161.21	4.82	5.05	1.92	2.28	0.12	0.12	0.03	4.35	0.03	1120.9	200
2 - 13	2500.5	16.22	161.68	4.85	4.90	1.83	2.14	0.33	0.0	0.04	4.29	0.05	1101.1	200
3 - 14	5317.4	29.43	155.98	4.53	4.84	1.94	2.45	0.22	0.11	0.05	4.21	0.06	2329.0	214
4 - 15	1071.7	1.73	0.76	0.42	0.75	2.29	1.70	0.33	0.11	0.05	0.07	0.12	753.3	221
5 - 16	28392.7	12.65	144.29	4.53	4.76	2.09	2.15	0.23	0.0	0.01	3.91	0.07	1112.5	212
6 - 17	25339.2	26.48	161.02	5.18	5.08	1.99	2.88	0.0	0.12	0.03	4.42	0.08	2748.0	198
7 - 18	910.7	3.99	161.90	4.67	4.92	1.80	2.81	0.0	0.0	0.05	4.34	0.10	520.5	216
8 - 19	476.4	3.63	161.89	4.72	4.89	1.86	2.16	0.43	0.32	0.08	4.38	0.08	197.3	224
9 - 20	225.1	2.00	162.18	4.56	5.00	1.99	2.10	0.22	0.0	0.13	4.37	0.07	81.8	216
0 - 21	1802.7	14.30	161.13	4.67	5.01	2.03	2.27	0.33	0.0	0.02	4.30	0.05	503.0	216
1 - 22	3379.6	28.54	161.41	4.67	4.99	2.05	3.23	0.86	0.0	0.06	4.40	0.06	1126.9	224
2 - 23	3024.4	30.85	161.65	4.64	5.11	2.00	2.00	0.56	0.11	0.04	4.36	0.05	1053.4	215
3 - 24	3717.8	35.28	162.11	4.65	5.01	2.11	2.52	0.53	0.21	0.02	4.32	0.07	1005.7	224

********** SEM HOURLY AVERAGE DATA **********

1977, 9.23. (266)

COUNTS/(CM2*SEC*STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	5179.7	40.51	160.95	4.61	5.04	2.00	2.41	0.39	0.0	0.03	4.29	0.10	1090.2	185
1 - 2	5451.7	39.80	161.30	4.61	4.96	1.62	2.45	0.11	0.0	0.02	4.34	0.09	1133.1	222
2 - 3	4556.6	36.87	161.43	4.51	5.05	1.56	2.58	0.0	0.11	0.02	4.32	0.05	1048.5	213
3 - 4	3870.5	35.38	161.09	4.58	5.06	1.58	2.30	0.11	0.0	0.07	4.36	0.03	905.7	224
4 - 5	4239.5	32.92	160.96	4.67	5.15	1.81	2.41	0.0	0.22	0.01	4.37	0.05	859.1	216
5 - 6	3987.1	34.00	161.60	4.50	4.92	1.72	2.27	0.0	0.0	0.02	4.34	0.05	784.6	219
6 - 7	4159.7	31.68	161.50	4.59	4.88	1.83	2.12	0.12	0.0	0.01	4.42	0.08	714.5	198
7 - 8	3767.4	35.92	161.14	4.60	4.88	1.86	2.09	0.0	0.11	0.06	4.35	0.10	641.0	224
8 - 9	3719.4	33.59	161.29	4.59	4.79	1.66	2.10	0.22	0.0	0.02	4.34	0.06	587.2	216
9 - 10	3542.9	34.85	160.98	4.67	4.96	1.68	2.22	0.0	0.32	0.08	4.34	0.03	596.2	224
0 - 11	3257.3	32.70	161.57	4.65	4.89	1.76	2.04	0.0	0.11	0.02	4.32	0.04	606.8	216
1 - 12	2115.9	25.39	160.99	4.53	4.86	1.74	2.07	0.33	0.11	0.02	4.38	0.04	525.1	215
2 - 13	1777.9	16.89	161.79	4.58	4.69	1.96	2.28	0.11	0.0	0.02	4.36	0.02	451.1	216
3 - 14	5019.1	20.32	156.22	4.54	4.93	1.93	1.92	0.0	0.0	0.03	4.21	0.04	581.9	205
4 - 15	1768.5	0.66	0.44	0.40	0.85	2.00	1.69	0.11	0.0	0.04	0.06	0.08	880.0	219
5 - 16	3662.4	4.98	134.65	65.87	4.51	1.85	2.47	0.31	0.16	0.0	3.69	0.08	1085.9	154
6 - 17	7298.3	19.45	160.74	4.58	4.99	2.08	2.78	0.0	0.0	0.05	4.31	0.04	1519.7	197
7 - 18	3608.2	16.78	161.01	4.64	4.82	1.84	2.75	0.22	0.0	0.02	4.32	0.02	1675.3	224
8 - 19	1851.9	18.62	161.02	4.63	5.09	2.12	2.30	0.22	0.0	0.02	4.39	0.07	1121.7	216
9 - 20	9018.1	31.21	161.36	4.49	5.08	2.02	2.74	0.11	0.0	0.07	4.34	0.09	1482.6	224
0 - 21	10990.5	39.54	160.82	4.70	4.91	2.11	2.70	0.0	0.11	0.02	4.38	0.06	2734.0	225
1 - 22	7598.6	38.20	161.04	4.74	5.19	1.68	2.41	0.0	0.22	0.0	4.30	0.04	3577.9	225
2 - 23	6698.0	38.22	161.05	4.62	5.02	1.87	2.78	0.12	0.0	0.01	4.36	0.04	3462.8	228
3 - 24	6597.5	39.77	161.78	4.87	5.09	1.69	2.61	0.21	0.0	0.11	4.37	0.14	3351.6	115

* SPL = Number of data points (Sampling number) per hour
Blank = no data

•••••••••••••••••••• SEM HOURLY AVERAGE DATA ••••••••••••••••••••

1977, 9.24. (267)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	7188.4	42.31	160.81	4.70	5.06	1.77	2.88	0.0	0.0	0.02	4.38	0.24	3418.2	146
1 - 2	6781.4	40.90	160.39	4.61	5.02	2.39	2.96	0.0	0.23	0.02	4.33	0.06	3824.5	209
2 - 3	6141.3	41.00	161.51	4.72	4.98	2.00	3.15	0.0	0.0	0.04	4.36	0.06	3959.0	212
3 - 4	4892.7	39.31	161.53	4.73	5.10	2.06	2.94	0.13	0.0	0.03	4.31	0.10	3256.2	187
4 - 5	4456.8	37.63	161.04	4.50	5.06	2.09	2.46	0.11	0.0	0.06	4.32	0.07	2759.3	224
5 - 6	3661.6	35.63	161.37	4.62	4.84	2.14	2.49	0.0	0.0	0.05	4.36	0.06	2508.8	211
6 - 7	3349.0	35.37	161.35	5.21	7.33	6.92	5.00	0.44	0.11	0.05	4.41	0.14	2697.2	220
7 - 8	2898.8	38.09	169.73	14.48	23.55	29.48	12.88	1.34	0.67	0.14	4.98	0.34	2526.5	215
8 - 9	2695.7	44.44	188.10	34.82	43.56	49.66	17.21	2.59	1.83	0.72	5.33	0.47	2497.5	222
9 - 10	2281.8	51.21	214.39	57.37	62.37	61.22	20.02	5.88	2.22	1.25	5.54	0.70	2035.7	216
10 - 11	2558.8	52.36	201.63	47.94	59.13	54.66	18.29	5.15	2.69	1.05	5.66	0.51	2247.6	214
11 - 12	2524.4	50.59	205.42	41.92	52.81	47.79	17.07	5.72	2.27	1.04	5.39	0.56	2344.2	222
12 - 13	2667.6	50.97	201.15	37.89	47.15	45.67	15.12	4.62	1.82	1.64	5.46	0.35	2882.6	171
13 - 14	2726.7	43.10	184.11	33.72	40.20	35.49	14.23	3.46	2.26	0.86	4.97	0.43	3064.2	180
14 - 15	2873.0	9.11	35.35	31.37	34.14	34.74	11.52	3.42	1.43	0.74	0.96	0.40	3011.7	84
15 - 16	2086.5	28.73	187.91	38.39	36.03	31.58	10.83	2.74	1.82	1.01	4.99	0.32	2500.9	1[illegible]
16 - 17	2729.7	36.69	191.67	34.41	32.21	28.15	10.40	4.43	2.11	0.89	5.03	0.42	3488.1	216
17 - 18	2911.0	38.91	189.58	29.16	28.15	23.87	9.35	4.28	1.60	0.71	5.01	0.37	3553.6	224
18 - 19	2976.2	48.22	187.34	30.01	27.99	22.48	9.15	3.55	1.66	0.74	4.87	0.35	3592.9	216
19 - 20	3353.2	54.79	196.09	30.46	26.61	20.86	8.43	4.46	2.44	0.60	4.74	0.19	4143.2	177
20 - 21	3683.7	66.93	199.76	33.66	27.29	20.43	8.38	5.49	2.22	0.85	4.87	0.25	4680.5	205
21 - 22	4933.5	75.37	193.10	28.65	23.02	18.40	6.76	6.05	3.35	0.57	4.67	0.28	4613.1	186
22 - 23	5530.5	61.75	193.80	29.38	22.18	16.92	6.91	5.71	2.67	0.74	4.80	0.21	5789.1	197
23 - 24	5797.5	69.13	190.88	27.14	20.62	14.65	6.26	5.41	1.89	0.67	4.69	0.22	6468.2	177

•••••••••••••••••••• SEM HOURLY AVERAGE DATA ••••••••••••••••••••

1977, 9.25. (268)

COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	6250.7	63.53	195.22	29.24	19.98	14.12	7.10	7.17	1.95	0.53	4.74	0.23	6910.4	147
1 - 2	6251.0	80.96	194.81	30.19	18.27	12.93	6.08	7.98	2.74	0.65	4.68	0.20	7208.3	210
2 - 3	6663.9	76.49	197.41	27.85	18.44	12.01	6.03	6.83	0.98	0.52	4.63	0.27	7160.2	222
3 - 4	6028.8	81.41	192.72	26.28	17.19	10.61	5.53	7.51	2.20	0.42	4.61	0.17	6126.4	185
4 - 5	5993.3	81.24	191.34	23.48	15.53	9.27	4.93	4.26	0.44	0.46	4.52	0.24	5797.5	163
5 - 6	4792.0	80.23	189.85	403.26	13.59	8.59	4.45	1237.60	1.17	839.08	4.50	0.13	5038.1	204
6 - 7	4343.4	84.44	192.19	23.53	14.18	10.09	5.05	11.34	2.52	0.68	4.77	0.55	4704.7	1[illegible]
7 - 8	3480.5	66.16	176.75	18.34	12.42	9.04	4.62	4014.41	0.99	0.51	4.49	0.13	3843.8	9[illegible]
8 - 9	2826.4	66.34	183.80	18.11	12.59	7.76	3.41	5.12	1.20	0.24	4.47	0.23	3229.5	159
9 - 10	2138.0	77.49	185.68	18.52	11.50	7.07	3.65	4.14	0.44	0.35	4.48	0.21	2309.2	220
10 - 11	2337.1	73.13	183.13	17.34	11.40	6.91	3.38	3.93	0.90	1.72	4.49	0.09	2594.2	213
11 - 12	2072.7	66.98	180.29	16.36	11.05	6.14	3.36	4.64	0.76	0.27	4.51	0.14	2502.0	222
12 - 13	1919.1	62.52	173.42	14.98	10.20	6.52	3.55	3.87	0.85	0.26	4.40	0.14	2431.4	19[illegible]
13 - 14	1983.0	54.47	161.73	12.83	9.93	5.45	3.11	3.34	0.76	0.15	4.11	0.11	2581.2	22[illegible]
14 - 15	1772.5	13.06	13.42	8.85	5.24	5.59	2.47	2.18	0.48	0.18	0.17	0.10	3384.6	198
15 - 16	1748.7	22.80	139.40	12.47	8.88	4.98	3.67	3.18	0.38	0.25	4.39	0.11	3844.6	188
16 - 17	1855.9	36.67	166.37	13.45	9.62	5.05	4.34	2.27	0.76	0.26	4.46	0.06	4286.6	222
17 - 18	2252.7	46.99	173.15	13.08	9.12	5.21	4.15	3.47	0.78	0.24	4.43	0.06	4668.7	214
18 - 19	2508.2	49.41	169.89	11.78	8.26	4.98	4.32	2.17	0.22	0.15	4.48	0.19	4839.8	222
19 - 20	2830.2	53.68	170.40	11.98	8.73	4.86	3.70	1.89	0.22	0.16	4.36	0.05	5409.8	215
20 - 21	3930.9	58.42	174.43	11.33	8.33	4.50	3.89	2.66	0.89	0.16	4.43	0.11	6097.6	218
21 - 22	4139.0	58.26	174.03	11.73	8.54	3.96	3.83	2.14	0.86	0.20	4.35	0.10	7011.1	224
22 - 23	4412.1	58.36	170.74	10.48	7.86	4.31	3.76	2.17	0.24	0.20	4.27	0.10	7021.6	199
23 - 24	4400.4	46.40	167.61	9.50	7.51	4.15	3.79	0.99	0.50	0.16	4.40	0.04	6907.7	145

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COUNTS/(CM2•SEC•STERAD)

U.T.	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5	EL	SPL*
0 - 1	4386.8	46.70	159.81	841.59	7.48	4.16	3.83	4.17	8.10	0.28	4.37	0.08	6559.6	201
1 - 2	4456.6	46.11	163.52	8.35	7.40	3.60	3.81	2.25	0.47	0.10	4.28	0.10	6674.6	202
2 - 3	4490.5	44.24	165.62	8.34	7.33	3.67	3.57	1.14	0.23	0.21	4.38	0.10	6957.2	210
3 - 4	4956.5	48.96	166.65	8.73	7.25	3.52	4.22	1.29	0.32	0.12	4.39	0.09	7545.8	223
4 - 5	4241.3	48.89	167.78	8.70	7.16	3.54	3.50	1.77	0.55	0.11	4.39	0.08	6900.0	216
5 - 6	3552.8	51.63	165.63	8.55	6.59	3.37	3.34	1.18	0.43	0.07	4.35	0.06	5586.6	224
6 - 7	3218.3	49.66	161.13	8.07	6.83	3.26	3.19	1.66	0.78	0.18	4.40	0.11	4707.3	216
7 - 8	3338.5	49.72	162.06	7.66	6.86	3.12	2.80	0.97	0.32	0.04	4.44	0.07	4453.7	222
8 - 9	3018.3	50.36	156.59	7.32	6.56	3.54	2.80	1.01	0.22	0.07	4.37	0.09	4026.1	213
9 - 10	2208.7	52.06	156.10	8.48	6.43	3.32	3.19	1.39	0.32	0.08	4.37	0.07	3602.1	224
10 - 11	783.8	53.43	143.61	7.68	6.33	2.81	2.15	0.78	0.33	0.14	4.42	0.07	823.5	216
11 - 12	575.3	45.67	138.73	7.61	6.01	2.72	2.11	2.11	0.33	0.02	4.30	0.05	458.0	216
12 - 13	433.4	41.25	132.08	7.16	6.01	2.69	1.84	1.09	0.54	0.06	4.39	0.11	831.9	220
13 - 14	262.1	31.97	122.54	6.91	5.95	2.80	2.09	1.13	0.56	0.03	4.21	0.03	386.8	170
14 - 15	430.9	9.39	5.87	2.97	1.94	3.09	1.69	1.64	0.23	0.10	0.08	0.06	1354.5	204
15 - 16	227.6	13.83	651.62	6.14	5.16	2.63	1.91	1.02	0.13	0.07	3.88	0.18	192.0	1[illegible]
16 - 17	513.8	20.27	126.18	6.71	5.83	2.81	2.31	1.45	0.11	0.07	4.39	779.16	372.2	215
17 - 18	532.6	10149.58	796.78	5.98	6.01	2.69	1.52	0.16	0.0	1094.84	4.34	0.07	1801.2	153
18 - 19	411.0	42.38	2128.12	902.09	5.96	2.61	1.77	0.90	0.13	0.08	4.32	0.10	573.2	187
19 - 20	513.5	643.89	132.00	6.88	5.93	2.89	1.88	1.09	0.0	49.66	4.41	0.05	733.7	197
20 - 21	593.7	45.49	129.41	6.45	5.85	2.86	1.89	65.85	0.46	0.05	4.38	0.09	970.2	210
21 - 22	576.7	47.14	121.59	6.02	5.37	2.02	2.21	0.50	0.50	0.05	4.27	0.08	982.2	96
22 - 23	2084.0	48.20	122.52	5.86	5.55	3.23	2.12	0.31	15321.85	0.03	4.48	0.07	1024.0	77
23 - 24	1884.2	44.42	126.36	5.33	5.61	2.77	2.15	0.50	0.0	0.09	4.32	0.09	1278.1	193

* SPL = Number of data points (Sampling number) per hour
Blank = no data

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